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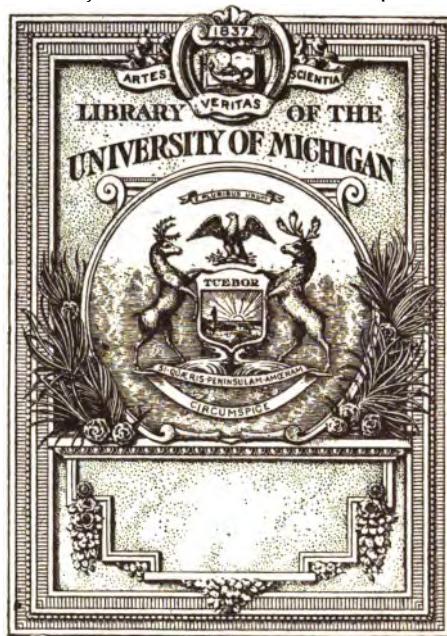
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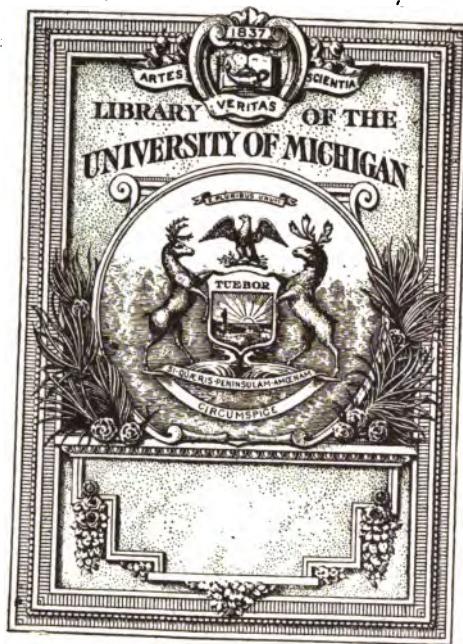
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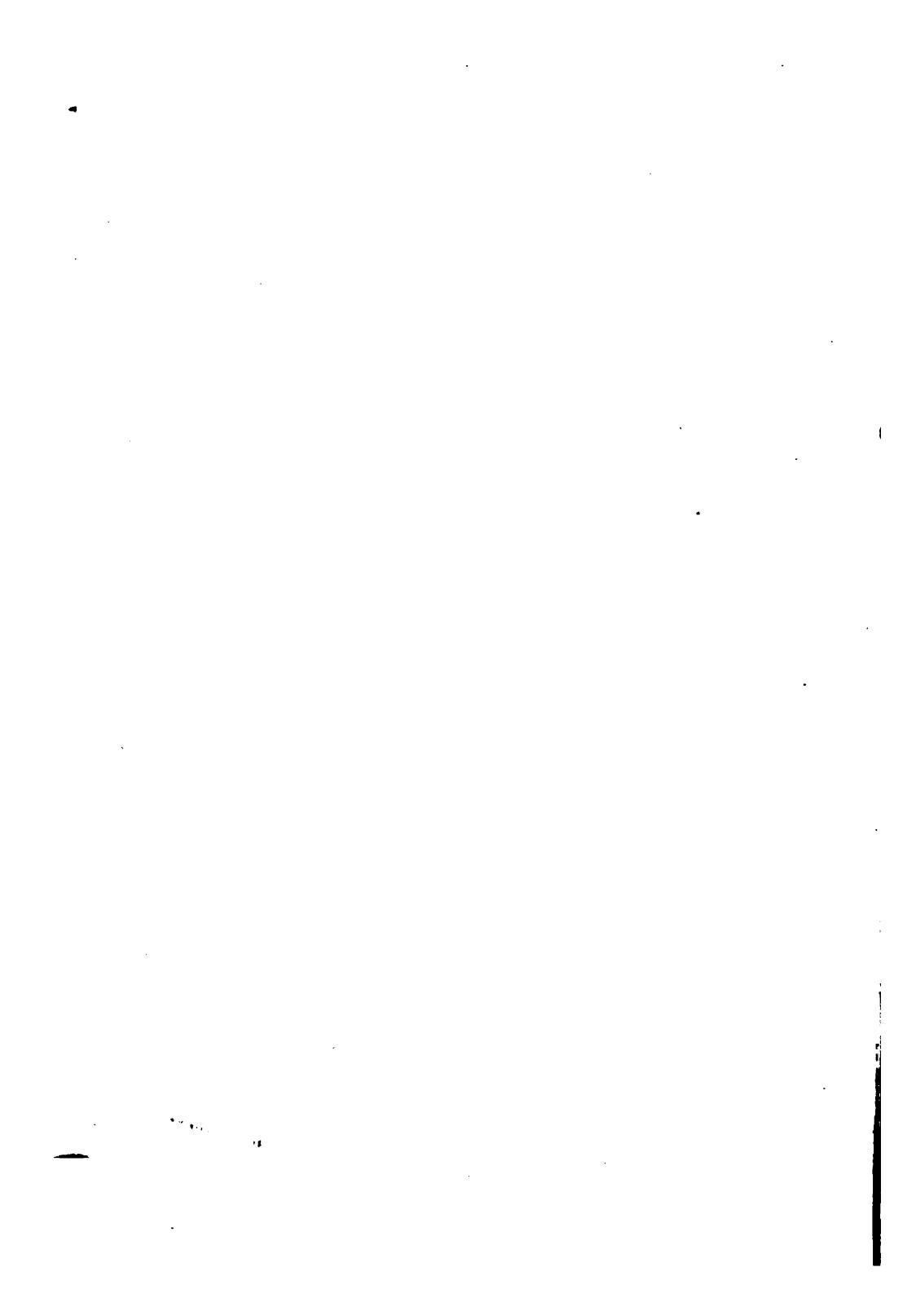
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AN INDIAN WITH HIS LOAD, MEXICO CITY

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INDUSTRIAL MEXICO

1919 Facts and Figures

BY

P. HARVEY MIDDLETON

(ILLUSTRATED)

Mexico is the treasure house from which will come the gold, silver, copper and precious stones that will build the empire of tomorrow, and make the future cities of the world veritable Jerusalems.

—CECIL RHODES



NEW YORK
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1919

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FOREWORD

During his travels in Mexico gathering the facts and figures contained in this book, the author was fortunate enough to secure the active co-operation of the American Commercial Attaché, Edward F. Feely, and was also greatly assisted by Colonel Paulino Fontes, Director General of the Mexican railways under government control, Rafael Zerecero, his assistant, and M. Muñoz, the General Superintendent of the same railways. He especially wishes to extend his thanks to Robert H. Murray, correspondent in Mexico City for the New York *World* and Director of the Creel Committee on Public Information in Mexico during the war, to George F. Weeks, correspondent of the United Press and editor of the *Mexican Review*, and to C. A. McQueen, Chief of the Latin American Division of the U. S. Bureau of Foreign and Domestic Commerce. For photographs the author is indebted to C. B. Waite of Mexico City, and to the Mexican Petroleum Co., of New York.

P. H. M.

New York City,
August 25, 1919.

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INTRODUCTION

Business revival. Trade ambassadors visit Mexican capital. Growth of foreign trade. Native capital insufficient. Unwise legislation may be amended.

"MEXICO is the richest undeveloped accessible country in the world."

One evening in May, 1919, I was dining in Mexico City with the correspondent of a great American daily newspaper, a man who has spent twelve eventful years in Mexico, who has gone through all the revolutions, and who is today an unquenchable optimist on Mexico. The words at the head of this page are his.

"In the opinion of those who have carefully studied the situation," he continued, "Mexico is on the eve of the greatest era of development and prosperity that the country has ever seen. Worldwide demand exists for substantially everything that Mexico can produce. Many of these demands can be satisfied from no other source than Mexico. This fact, coupled with the impressive truth that, in the present stage of the world's progress and necessities, no rich

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undeveloped country like Mexico—particularly when it adjoins the youngest, wealthiest, most progressive nation under the sun—can be permitted to lie fallow, seems to place in the category of the incontrovertible the declaration that Mexico's economic star is in the ascendant. It may not soar or take unto itself full lustre for, possibly, months, or one or two years. But that it will do so, and soon, is as certain as that the night follows the day."

The Mexican Government rests under the heavy responsibility of continuing to create conditions which will enable the Republic to come into its own. It may be conservatively assumed that this will be done. Mexico has bled through nearly nine years of revolution. There will not be nine more years of revolution and lawlessness there. Even though the Mexicans themselves may be inclined to permit it, which is unthinkable, the world outside of Mexico will not.

The overthrowing of the old régime has, it is true, resulted in much unwise legislation, in some cases jeopardizing the industries created by American and European capital and energy—industries upon which Mexico is absolutely dependent. But the old order of things in Mexico, with single families owning millions of

acres and a dozen families owning entire states, has gone never to return. You can no more restore the Mexico of Porfirio Diaz than you can bring back the Russia of the Czars or the France of the days of Mme. de Pompadour. The present situation arising from the attempted "nationalization" of properties obtained by foreign investors either by concessions legally granted by former Mexican governments or by outright purchase, is equally impossible. The foreign holders of such properties, provided they comply with the laws under which their lands were originally acquired, have as clear a title to them as you have to your hat.

It is a fact that Mexico's total foreign debt is only about \$500,000,000. Such a sum is absolutely trivial when one considers that Mexico possesses millions of acres of virgin soil, oil fields which produced over 63 million barrels in 1918, thousands of mines of gold, silver, lead and copper, mountains of iron, unexploited fisheries, vast forests of timber which contain many varieties of precious hardwoods and dyewoods, and such a range of climates and soils that it is possible to produce all the cereal crops and 90 per cent. of all the known fruits of the world.

Humboldt called Mexico "a beggar sitting on

a bag of gold," and the present situation of "the greatest treasure house in the world" could not perhaps be better described. For, while Mexico has defaulted for several years in the payment of her foreign obligations and is now seeking financial assistance from other nations, she has unexploited natural resources, the mere scratching of which would provide the means to clear off all her national debt and place her on a sound financial basis.

Although there are still bandits and rebels in Mexico, and probably will be for a long time to come, I found in my recent trip from the Texas border to Vera Cruz a great many indications that Mexico—provided there is no really serious political disturbance—is "coming back." Mexico City during the time of my visit there in April and May was the meeting place for trade ambassadors from all parts of the world. These included manufacturers, bankers and engineers from the United States and Canada, from Great Britain, France, Spain, Italy, Holland, Denmark, Norway, Argentina, from Central and South America, and from Japan. These men were seeking orders and opportunities for investments, and were finding both.

There were delegations from New York, Philadelphia, Chicago, San Antonio and Dallas.

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There was a party from Oklahoma arranging to invest \$25,000,000 in the oil fields, another from Christiania, Norway, with a \$15,000,000 oil proposition; there was a group from Tokyo, Japan, investigating the newly discovered oil deposits in the Gulf of California, and there were a number of mining engineers from San Francisco. As a result of the tour in April, 1919, of Mississippi Valley business men throughout Mexico, American manufacturers secured large orders and made valuable connections. The rehabilitation of the Mexican railways will call for American railway supplies to the extent of about \$50,000,000. The Chicago Association of Commerce has opened a branch office in Mexico City, and the American Chamber of Commerce of Mexico has formed a New York auxiliary.

Mexico, with an area of 767,290 square miles, is seventeen and a half times the size of Cuba, and infinitely greater in resources. Cuba's products are limited to the tropical, chiefly sugar and tobacco. Mexico has these and also metals, oil, timber, corn, wheat, and livestock as possible products. It is three times as large as all of Central America and the West Indies combined, yet it has a population of only 15,063,207, or 19.6 per square mile.

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Because of geographical situation and the needs of each for the natural as well as the manufactured products of the other, fully 80 per cent. of the foreign trade of Mexico will always be with the United States. Mexico produces raw materials in the shape of minerals, hard woods, fibre, rubber, hides, oil and a great variety of other products for which there is a heavy and constant demand in this country. On the other hand many of the natural products of Mexico find their way back to Mexico after having entered into various forms of manufactures. It has been estimated that a revival of business in Mexico will mean an increase in the export trade of 1,000 per cent. Mexican oil production has increased fifty-four times since 1907. The total export business of Mexico for the year 1918 amounted to \$183,652,125, American money, of which the United States took \$175,037,150.

No one knows the extent of Mexico's natural resources, for they have never been adequately surveyed or estimated. Mexico is in the position of a mismanaged, fundamentally sound business. An impressive indication of the economic vitality and resiliency of Mexico is afforded by the fact that last year, in face of ruin and prostration wrought by the revolution, her

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revenues were greater than in any other similar period in her history.

Native Capital Insufficient

Edward F. Feely, American Commercial Attaché in Mexico, said to me, during my recent visit to Mexico City: "Mexico cannot finance her reconstruction with native capital. She does not possess it. If she did it is questionable if it would be available. Mexicans are proverbially loath to enlist what sparse capital they have in development enterprises in their own country, no matter how attractive and conservative. They are not an investing, developing people. Foreign capital is needed for the rehabilitation of her lines of communication—principally for rolling stock and motive power. Reconstruction is being hampered by inadequate transportation facilities.

"Foreign capital is required to prosecute the development of her petroleum fields, her mines, her farms, her sugar and coffee plantations, her fisheries, her timberlands. Millions of dollars of American capital is now waiting to go into Mexico—eager to enter the country. Some of it is already being slowly released for use there. But the bulk of it is waiting until more definite

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assurances are obtained that sane, rational and just legislation will be enacted which will supply foreign investors with the proper and adequate protection which they have a right to expect and demand. It is safe to assume that the necessary safeguards will be forthcoming. Already the Mexican government is evincing conservative tendencies of a nature which are indispensable to the establishment and practice of a friendly and mutually advantageous co-operation between states, and to the encouragement of international, commercial and investment relations."

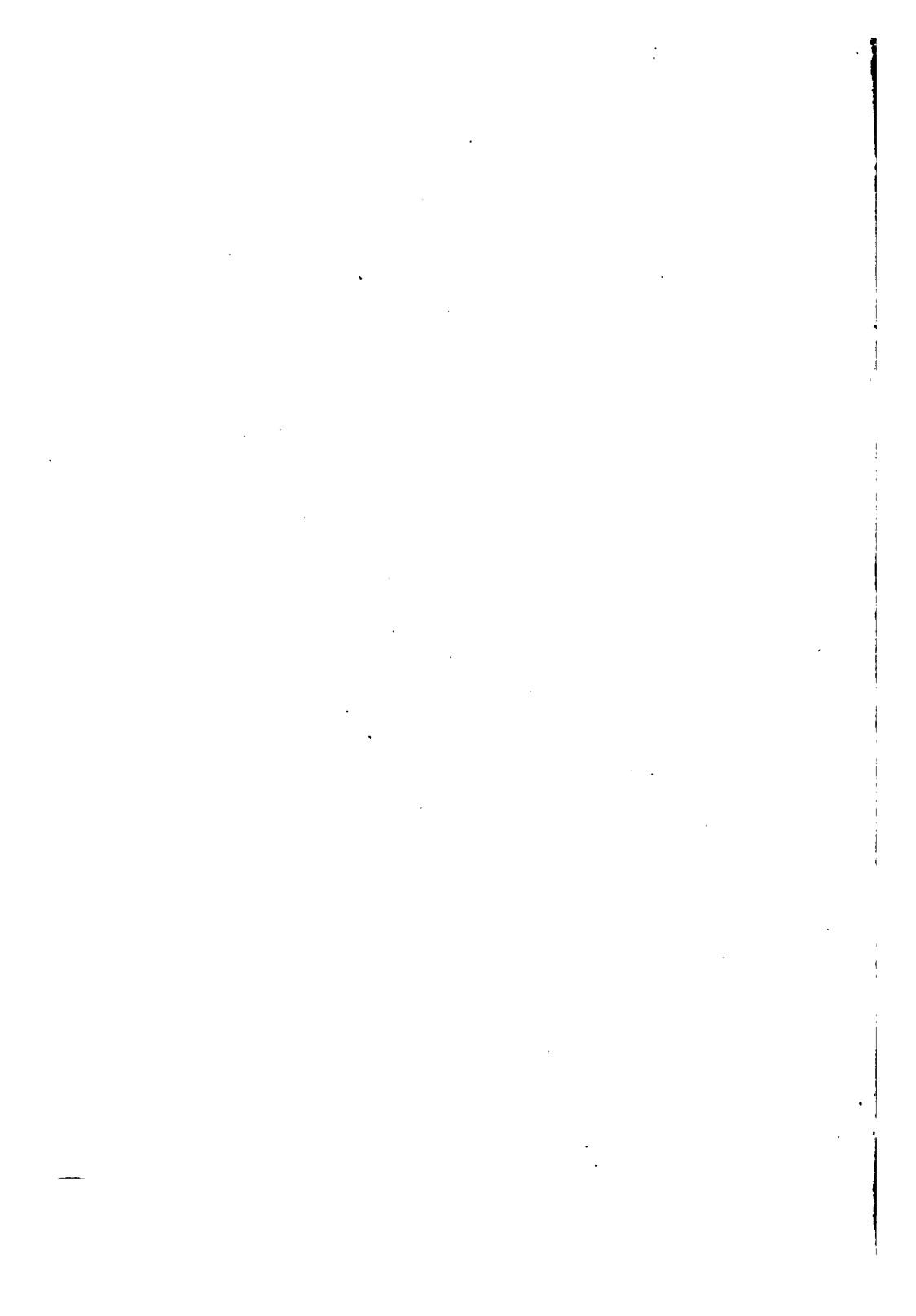
// Legislation to Be Amended?

In view of the widespread interest in Article 27 of the new Constitution of Mexico (see Chapter XI), which if literally interpreted would seriously injure all American interests in Mexico, it may be stated that during my visit to Mexico in April and May, 1919, business men of good standing with whom I talked were of the opinion that an amendment would be made which would protect foreign interests.

Announcement was made by one high official that the Mexican Government will pass a new law recognizing the right of ownership in the sub-soil in all properties purchased before the

promulgation of the new constitution, the date of which was February 5, 1917. Properties purchased after that date, he said, would be subject to the law which gives the subsoil to the nation.

The possibility that American financial interests, (acting of course with proper regard to the assurances which are given as to the safety of previous investments) may assist the Mexican Government in floating a loan in the United States, has recently been much discussed by merchants and manufacturers who look upon Mexico as logically one of the best markets for American goods. It is said that the present government in Mexico is considering the recognition and refunding of the debts contracted under the Huerta régime. If such a step by the Mexican Government is in contemplation, then, if stable conditions are assured and protection is given to capital already invested, the prospects for a rapidly developing trade with Mexico would be better than they have been in a long period of years.



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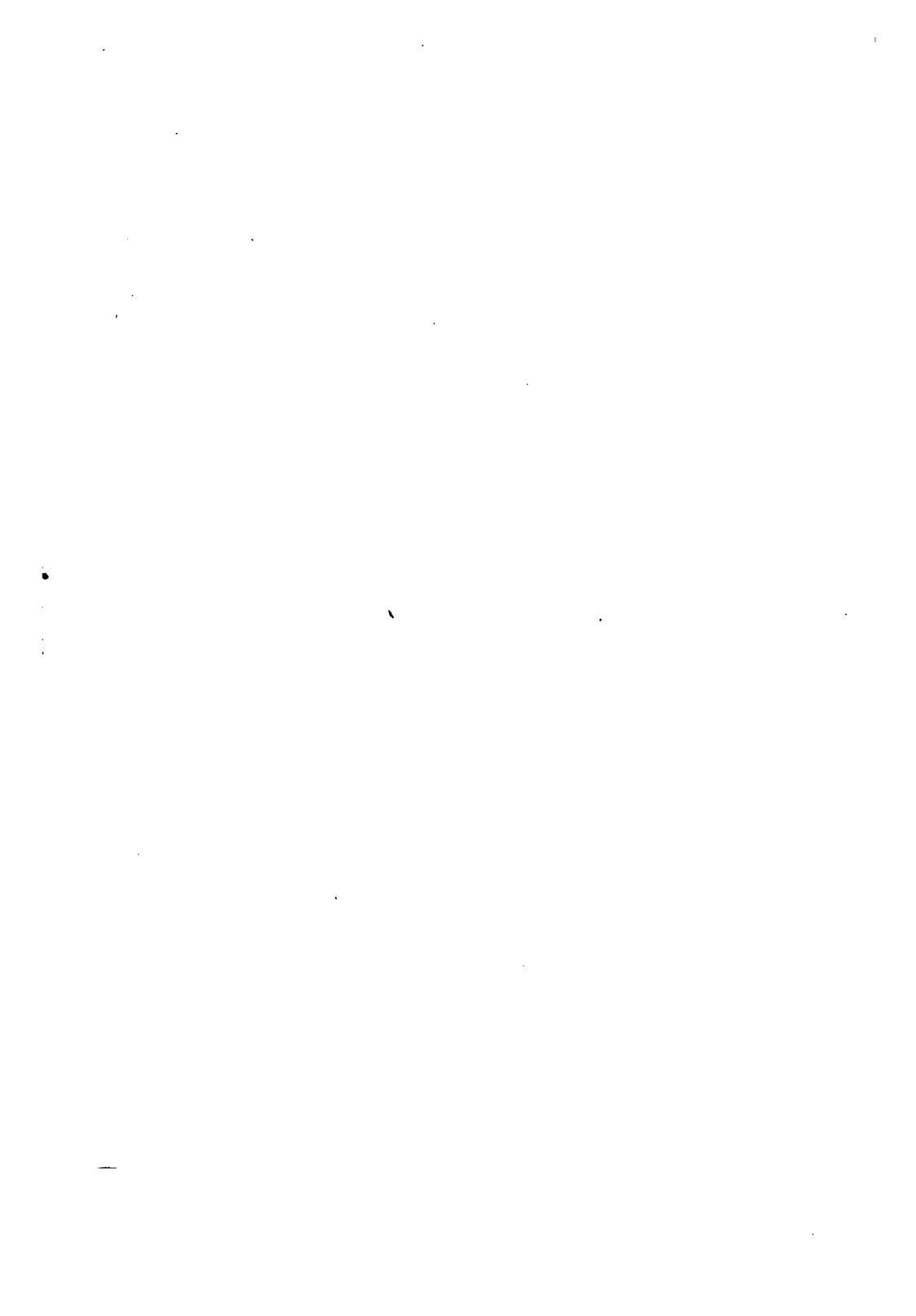
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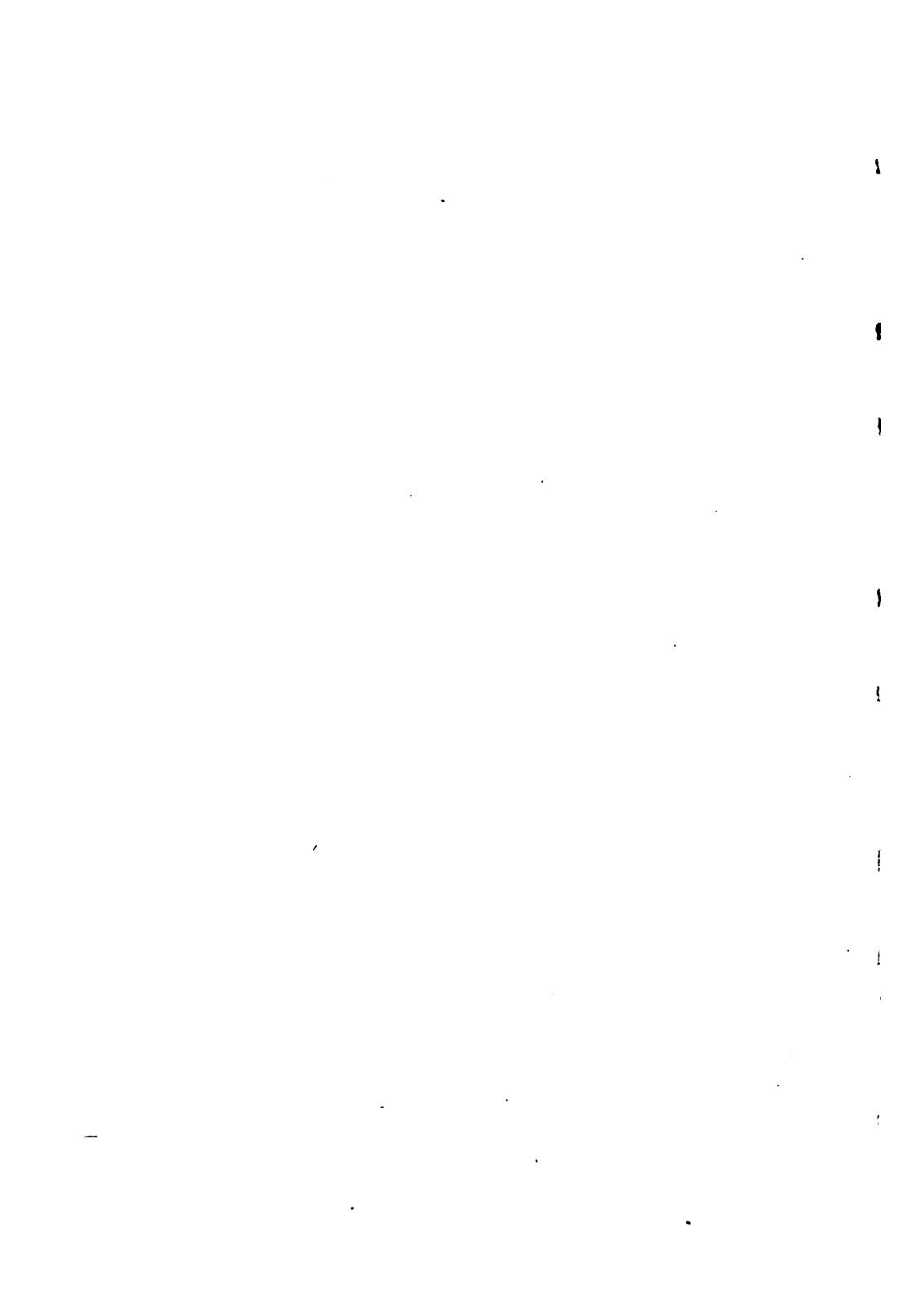
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INDUSTRIAL MEXICO



INDUSTRIAL MEXICO

CHAPTER I

GOVERNMENT RAILWAYS

Laredo, Texas, to Mexico City. Conditions in the capital. Shortage of equipment. Growth of railways. Trip through the danger zone. Southern lines. Equipment in service.

It is an unfortunate fact that the principal items of news from Mexico are reports of the activities of Villistas, Zapatistas, and Felicistas and of other rebels and bandits who infest certain portions of Mexico, and that the average American is convinced that Mexico is an industrial, physical, political and financial ruin. That this is far from the truth was strikingly emphasized to me on my trip through Mexico in April and May, 1919.

When I was invited to make a trip over the railway lines of Mexico under government control, I gladly availed myself of the opportunity to obtain at first hand facts and figures regarding transportation conditions. Leaving New York on April 8, we reached Laredo, Texas, on

the morning of April 11. Here we laid over for a day. The Pullman Company will not at present allow any of its cars to go into Mexico. So on the morning of April 12, we crossed the river in an automobile to Nuevo Laredo and boarded the train of the National Railways of Mexico.

Our Pullman was a duplicate of the one we had travelled in from San Antonio to Laredo, and we began our journey to the Mexican capital at 11 A. M. through a country which differed but little from that on the American side, for this stretch of territory is one of the few in the Mexican republic that does not show mountains against the skyline. The line traversed the deserts of the great plateau and passed through hundreds of miles of dry and treeless plains. En route we passed many freight cars in bad order, with holes roughly patched with pieces of wood or tin, and at Monterey, which we reached in the late afternoon, we saw thirty locomotive frames standing within the steel skeleton of what was apparently once a repair shop. Our military guard of forty soldiers, which we had taken on at Nuevo Laredo, was changed here for a fresh set. These travelled with us as far as San Luis Potosi, and here the guard was again changed for the run to the capital.

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The journey by rail from Laredo to Mexico City was made with no other delay than that occasioned by locomotive troubles on steep grades, requiring in consequence a few more hours than in the old days of almost clock-like precision of operation, when the roads were in perfect condition and rolling stock was abundant. The arable land in the northern portion of the republic, confined to narrow limits at best, is either under cultivation or being put into condition for production, and as the central portion of the plateau was reached, and the fertile valleys of San Luis Potosi, Queretaro, Guanajuato, and other states were traversed, a scene of agricultural activity was observed. Piles of ore at various stations indicated that mining is active.

The railway from Laredo to Mexico City was originally a narrow gauge line, built under American auspices. It was opened for traffic in November, 1888, and the widening to standard gauge was completed in 1903. The length of the main line to the capital is 803 miles, and it is the shortest route between the frontier and the capital. On the journey the train crosses the states of Tamaulipas, Nuevo Leon, Coahuila, San Luis Potosi, Guanajuato, Queretaro, Hidalgo, and penetrates the state of Mexico.

Many stations and a great deal of rolling stock were destroyed on this line during the revolution, but the government has rebuilt tracks, bridges and stations, has repaired and purchased rolling stock, and is still repairing and purchasing more as the income warrants. The heavy expenses have been met with no other source of revenue than the ordinary business of the line, with the necessity of carrying military guards on all trains at heavy cost.

Mexico City in April and May, 1919

We arrived at Mexico City at two o'clock in the morning of April 14, 1919, at the Colonia Station, and found the station plaza crowded with automobiles and two-horse carriages waiting to carry passengers to their homes or hotels. A "cargador" seized our baggage, we engaged a machine, and in a few minutes from the time we stepped off the train we were spinning along the broad, well-lighted and scrupulously clean Paseo de la Reforma—a magnificent boulevard which runs from the entrance to Chapultepec Park to Avenida Juarez.

Ten minutes later we were registered at the Hotel Regis and taken up in the elevator to our floor by a smiling Indian. The next morning

we hired a seven-passenger car at a cost of five pesos (\$2.50) an hour to see the city. In place of the dead, dirty and unsafe city about which we were solemnly warned before leaving New York, we found a metropolis of 900,000 people, with well-paved, clean streets, beautiful public and private buildings, with a system of trolley cars equal to those found in any American city—a city splendidly lighted at night, with traffic regulations which were enforced, with a good police system and a first-class fire department.

Regarding the latter, one of the largest fire stations was opposite our hotel, and on May 3 there was a review of the fire department, and all their equipment was on parade. They have what is apparently the latest design of motorized engines, motor trucks for ladders, nets, and blankets, and they also have one feature which I have never seen in an American fire department—men mounted on bicycles carrying “first-aid” packages on their backs and with the Red Cross on their sleeves. These men attend fires and have sufficient knowledge to take care of minor cases of burns or injury.

In the crowded avenues in the business sections the “move on” of the policeman is a familiar sound. At crossroads traffic policemen have iron posts identical with those at Fifth

Avenue and Forty-second Street, New York, with the same handle to turn the sign to "Adelante" or "Alto"—"Go ahead" or "Stop."

Along one side of the beautiful little park called the Alameda, Indians in tents or with portable tables sell candied fruits, pottery, baskets, blankets, toys, tortillas, drawn lace, decorated leather, and a thousand other things. The custom of selling in the streets in this manner is typical of all Mexico—and has changed little since the days of Cortes.

In addition to trolley cars reaching every section of the city and suburbs, there are thousands of Fords and two-horse carriages, as well as innumerable motor jitneys, known as "camiones," which carry passengers for ten centavos (five cents) for short trips. Riding in one of the trolley cars in the business district near the Cathedral, where strap-hanging is by no means unusual, I was somewhat surprised to read the following notice pasted on one of the windows:

"Gentlemen: When you see a lady standing on her feet, you will not find it possible to remain sitting with tranquillity. Your education will forbid you to do so.

"GENERAL MANAGER OF THE RAILWAYS."

Restaurants, hotels, theatres and moving-

picture houses are all open and doing a thriving business, and there is every evidence of activity in all the stores. Department stores such as the Palacio de Hierro and the Centro Mercantil were well filled. The American and British clubs entertained goodly numbers at luncheon and dinner. Smokers are held frequently at both clubs. The Thieves' Market is still selling "antiques" and "Aztec relics" to unsuspecting visitors, and the vendors of serapes still haunt the hotels.

The only evidence of rebel activities during our stay in the capital occurred on Labour Day, the fifth of May. A celebration had been planned at Chapultepec Castle, with a fine electrical display. About 8 p. m. all the electric lights in the city went out, and it was stated that the Zapatistas had shot down the power transmission wires which carry the current from a central plant situated many miles out, and which supplies light and power to the capital and other smaller cities near by. We had to use candles for three hours, by which time the auxiliary plant in the city was put in operation, and everything was again normal.

INDUSTRIAL MEXICO

Mexico's Shortage of Railway Equipment

The day following my arrival in Mexico City I began an investigation at the offices of the Mexican Government Railway Administration with the object of ascertaining the extent of the deterioration of the physical equipment of the railways under government control. At the end of three weeks I was able to construct a table showing the shrinkage in the railway equipment of Mexico since 1913, as the result of revolutions and the lack of material with which to repair rolling stock. This table is given below:

SHRINKAGE IN MEXICAN RAILWAY EQUIPMENT

	Metric tons	Number destroyed or condemned since 1913
Standard gauge box cars	13.6	41
	18.2	67
	22.7	62
	27.2	1,673
	36.3	1,630
Narrow gauge box cars	20.0	254
	25.0	204
	27.2	16
	10.0	21
	20.0	270
	12.0	86
	20.0	27

GOVERNMENT RAILWAYS

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	Metric tons	Number destroyed or condemned since 1913
Standard gauge cattle cars	18.2	11
	22.7	4
	27.2	399
	36.3	309
Narrow gauge cattle cars	20.0	45
	10.0	11
	27.2	5
	12.0	13
Standard gauge gondolas	22.7	23
	27.2	407
	36.3	592
Narrow gauge gondolas	20.0	22
	10.0	3
	25.0	44
Standard gauge hopper cars	36.3	20
	45.4	151
Standard gauge flat cars	13.6	12
	22.7	25
	27.2	178
	36.3	502
Narrow gauge flat cars	25.0	124
	22.0	65
	12.0	24
Standard gauge coke cars	22.7	8
	27.2	5
Standard gauge tank cars	27.2	25
	36.3	106
	45.4	95
	20.0	2
	25.0	9
Narrow gauge tank cars	25.0	16
Standard gauge cabooses	13.6	82
	18.2	15
	22.7	61

INDUSTRIAL MEXICO

	Metric tons	Number destroyed or condemned since 1913
Narrow gauge cabooses	11.5 10.0 12.0	11 28 5
Standard gauge ballast cars		35
		18.2 36.3 45.4
Standard gauge passenger cars, combina- tion first and second class .....	.....	22
Narrow gauge passenger cars, combina- tion first and second class		12
Standard gauge passenger cars, second class		55
Narrow gauge passenger cars, second class		44
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Merely to bring the Mexican railways back to the state of efficiency existing under the American operating officials prior to the revolution, it will be necessary to replace all the rolling stock mentioned above. In addition, it is estimated that there will be needed 87,500 tons of rails, accessories and supplies. Since 1910 revolutions have resulted in the destruction of over 10,000 freight cars. At the present moment on the lines north of Mexico City there are 5,000 freight cars laid up awaiting material with

which to repair them, as well as 400 locomotives and 225 tank cars.

In view of this situation, large purchases of supplies must be made within the next twelve months to keep the railways running. Purchases are being made constantly by the New York office of the Mexican Government Railway Administration, which has a bank credit of about \$250,000 a month for this purpose.

Growth of Railways

It may be well here to give a brief review of the development of Mexican railways prior to the Carranza régime. Railway construction in Mexico started in 1854, when a line of ten miles was placed in operation between Vera Cruz and Tejeria. This line was gradually extended to the capital, which was reached in 1873. From 1877 to 1882 Mexico built more lines of railroad than any other Latin-American country, the average yearly construction during that period being 428 miles. In 1905 the railway mileage of Mexico amounted to 10,557, and in 1910 it was 15,260. There has been very little new mileage built since that date. Most of these railways have received subsidies from the Mexican Government ranging from \$6,000 to \$10,000 per

kilometre, according to the difficulty of the work.

In 1903 the Mexican minister of finance, Limantour, purchased \$5,000,000 of 4½ per cent. second debenture stock of the Interoceanic Railway. This purchase led soon afterwards to a further investment by the Mexican Government in railway stock, this time with the express object of exerting its interests both on the policy and routine of the National Railroad Company, the stock of which was acquired by the government. Limantour visited New York and Europe in 1903, and while in the former city concluded with Speyer & Co. an arrangement whereby the Mexican Government became the owner of a block of shares of the National Railway which gave it a preponderating influence. In 1908 the National Railways of Mexico was incorporated in the United States to take over and unite the properties of the National Railroad of Mexico and the Mexican Central.

The latter system, which thus became part of the National system, was incorporated in Massachusetts in 1880. The Mexican Government offered a subsidy of \$15,200 a mile, and the right was granted to import all materials for construction, repair and operation free of duty for fifteen years, with the further right of exemption

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from taxation for fifty years, dating from the completion of the line.

The main line was built from Mexico City to Ciudad Juarez, 1,224 kilometres, branches and subsidiary lines bringing the total mileage up to 3,426 kilometres. The Central claimed that there were but four cities in the whole republic possessing anything over 5,000 inhabitants which were not served by one or other of its systems, main line branches, divisions or extensions. The largest and most important places outside of Mexico City itself which this railway serves are: Guadalajara, 125,000 inhabitants; Leon, with 70,000; Aguascalientes and Zacatecas, each with 40,000; Guanajuato and Queretaro, each with 45,000, and numerous other towns with populations ranging from 35,000 down to 1,000.

This railway serves the most fertile and productive portion of Mexico, carrying a great mineral traffic, and passing through the enormously valuable silver belt, which formerly yielded one-third of the entire silver production of the world. It reaches manufacturing districts such as Jimenez, the cotton producing district of Lerdo, Torreon, where there are cotton mills; Aguascalientes, with woollen mills, silver and copper smelters, and also the location of the

largest railway machine shops, and San Luis Potosi, with its population of about 60,000.

The International Railroad, now also a part of the National system, was started in 1882 by that great American railroad pioneer, Collis P. Huntington at Ciudad Porfirio Diaz, and in six years it had reached Torreon. The next extension was to Durango, centre of a rich mineral district, which was reached in 1902. Huntington surveyed the line from Durango to the Pacific port of Mazatlan, but it was never finished. The Mexican Government has at present under consideration the completion of this line. Eighty miles have already been built west of Durango, but the remainder is in the mountainous region, where some twenty tunnels of various lengths and thirty large bridges will be required. It is estimated that the cost of the extension will be about \$15,000,000, but the expenditure will be warranted by the opening of a rich agricultural, mining, and timber region. The International at present serves the rich coal fields of Coahuila, and furnishes the outlet for the coal and coke of the famous San Esperanza mines. Two-thirds of the revenue of the mines is derived from its mineral traffic.

On these northern lines, all standard gauge, trains are being run without interruption except

in a few districts, notably the line from Chihuahua to Ciudad Juarez, where the Villistas are operating. At the time I was in Mexico (April and May) trains between Monterey and Matamoras, Monterey and Tampico, and Monterey and Torreon, were being operated without interruption, although a train was blown up by bandits between Monterey and Tampico, and traffic suspended for one day on April 11. Freight and passenger traffic has been augmented to a large extent. From Saltillo to Piedras Negras the coal traffic has increased greatly, while passenger traffic is large and regular. The line from Tampico to San Luis Potosi, which had been temporarily interrupted, had been restored to operation. From this city to Laredo traffic is normal and has been for an extended period.

The lines south of Mexico City under government control are: The Mexican Railway from the capital to Vera Cruz; the Vera Cruz and Isthmus; the Tehuantepec National, the Alvarado Railway, the Pan American, the Inter-oceanic, the Mexican Southern, and several smaller lines. The most important of these is the Mexican Railway, the first line to put Mexico in touch with the outside world, length 264 miles.

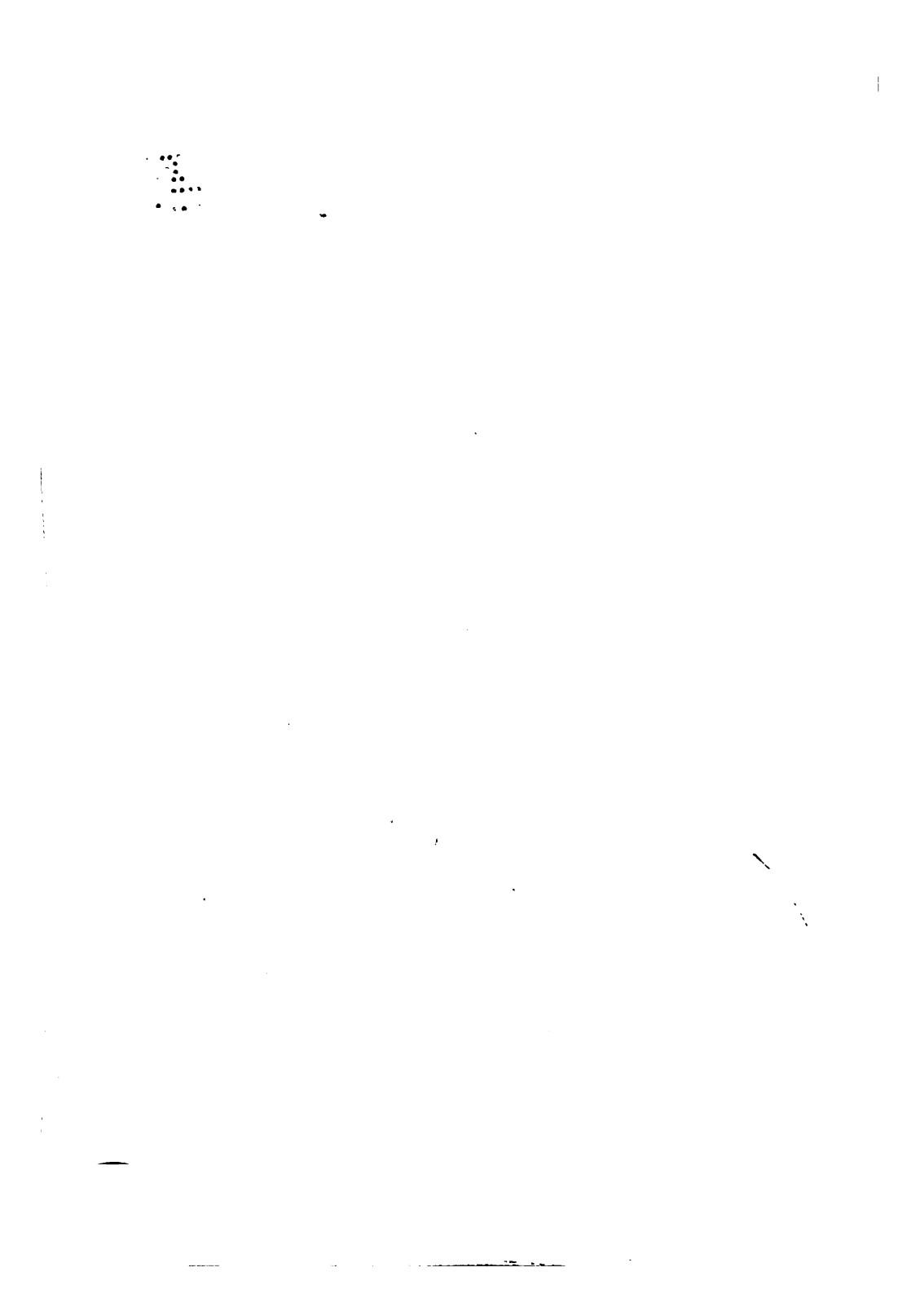
The Mexican Railway is operated today under conditions absolutely unique in railroading. Running through the rebel-infested state of Vera Cruz, it is protected throughout its length by a system of forts, or blockhouses. There are 70 of these blockhouses, each connected by telephone, one about every four miles, built close to the track, on raised ground, with watch towers, manned with Carranza soldiers. Ditches are excavated around each fort, and these ditches are protected by barbed wire entanglements strung at a reasonable distance from the trenches and around them.

A Trip Through the Danger Zone

Owing to rebel activities no trains are operated on this line at night. I boarded the train at the Buenavista station, Mexico City, on the night of May 7, and we pulled out at 5 A.M. with a military guard and made an uneventful run across the central plateau to Esperanza. On leaving this station we soon struck the most perilous part of the run through the mountains, a mile and a half above sea level, from Esperanza to Maltrata. The line is almost unsurpassed from a scenic point of view, ascending from the valley of Mexico to the summit of the



THIS IS ONE OF THE SEVENTY BLOCK HOUSES WHICH GUARD THE MEXICAN RAILWAY FROM REBEL AND BANDIT ATTACK BETWEEN MEXICO CITY AND VERA CRUZ. THEY ARE SITUATED ON HIGH GROUND OVERLOOKING THE TRACK, ONE ABOUT EVERY FOUR MILES.



Sierra Madre, reaching its highest point at Aco-cotla, near San Marcos, an elevation of 8,310 feet. At one point, at Alta Luz, the train is 2,919 feet higher than the topmost point of Mount Washington, and we looked down upon the valley spread out like a chessboard thousands of feet below, as the train plunged around dizzy barrancas, over spidery bridges spanning profound cañons, or along the curving roadbed cut in the solid rock of the mountain side.

All the way down the mountains we could trace the road, its serpentine trail drawn in and out of the valley and along the ridges, ever and anon doubling upon itself, but ever descending. At the Maltrata Incline the scenery is indescribable, the eye dominating a thousand square miles of mountain ridge and tropical valley, and from the car window it looks for all the world like the view from an aëroplane. One's mind shudders at the possibilities of a stick of dynamite carefully placed by a bandit at this point. A few days before at Las Vegas, in these same mountains, on the narrow gauge Interoceanic Railway, a train was dynamited by Felicistas and a number of persons killed.

Reaching Orizaba, we notice for a mile or so along the line great piles of wrecked railway equipment, the twisted frames of cars of every

description, engine frames, wheels by the hundreds with and without trucks, eloquent testimony to past revolutionary activity. Here we were joined by what they call the "explorers' train" to protect us from rebel attacks through the heavily wooded sections between this point and Vera Cruz. This train consists of a locomotive and four cars filled with soldiers, with soldiers also riding on the car roofs, fully armed, and ready for instant action. Our train followed behind, with another carload of soldiers on the rear. We soon reach the most dangerous pass on the line, going through a series of tunnels and then creeping gingerly across the Metlac Bridge, 350 feet long, built upon a curve of 325 feet radius, on a 3 per cent. grade, 92 feet above the river. Eight cast and wrought iron pillars on masonry bases uphold it, and when a long train is winding across it the horseshoe effect is very striking. Shortly after this we reached Cordoba, and from here to the coast the run was through level country, Vera Cruz being reached at 6:15 P. M., the journey from the capital having taken a little over thirteen hours.

Other Southern Lines

The Mexican Southern Railway, also operated by the government, runs from the city of Puebla

to the city of Oaxaca, and was built with British capital. Two years were spent in completing the line, which passes through an exceedingly difficult country. The track parallels the Inter-oceanic line as far as Amozoc. The Inter-oceanic Railway was incorporated in 1888 by a special charter, the idea being to construct a line from Vera Cruz on the Gulf to Acapulco on the Pacific, but the line, which is narrow gauge, is still far short of its ultimate destination.

The Tehuantepec National, recently purchased from the Pearsons of London by the Mexican Government, was completed in 1907. The total length of the line, which crosses the Isthmus of Tehuantepec from the Gulf of Mexico to the Pacific, is 190 miles. There is also a small branch line. Fine harbours have been constructed at the ports of Salina Cruz on the Pacific and Puerto Mexico on the Atlantic. Large warehouses have been erected for the storage of freight. At both places trains are run up to the ship's side, where there are electric cranes for loading and unloading. There is a fine dry dock at Salina Cruz.

A large amount of traffic which formerly went around Cape Horn or across the Panama Railway now goes via Tehuantepec. This route is 1,200 miles shorter between New York and San

Francisco than the Panama Canal. Not only is it a shorter route to the Pacific ports of the United States, but to the Orient and Australia. Sugar cargoes, for instance, can be carried from Hawaii to New York via Tehuantepec, a distance of 5,305 miles, instead of carrying them around Cape Horn, over 12,000 miles. In the rebuilding of the Tehuantepec Railway and the improvement of the two ports \$65,000,000 has already been spent.

Equipment in Service

The following equipment is at present in use on the lines under government control:

Railways		Standard gauge	Narrow gauge
National Railways ...	Locomotives	767	295
	Passenger cars ..	497	258
	Freight cars	11,062	2,778
National Tehuantepec.	Locomotives	47	....
	Passenger cars ..	12	....
	Freight cars	1,008	....
Vera Cruz & Isthmus.	Locomotives	16	....
	Passenger cars ..	10	....
	Freight cars	193	....
Pan American	Locomotives	7	....
	Passenger car ..	1	....
	Freight cars	40	....
Vera Cruz to Alvarado	Locomotives ....	....	7
	Passenger car ..	....	1
	Freight cars ....	....	40



THE EXPLORERS' TRAIN. THIS IS THE MILITARY TRAIN WHICH RUNS AHEAD OF THE PASSENGER TRAIN ON THE MEXICAN RAILWAY THROUGH THE REBEL COUNTRY BETWEEN MEXICO CITY AND VERA CRUZ. SOLDIERS RIDE INSIDE AND ON CAR ROOFS FOR INSTANT ACTION IN CASE OF REBEL OR BANDIT ATTACK

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Railways		Standard gauge	Narrow gauge
Mexican Railway	{ Locomotives	54	11
	Passenger cars ..	58	13
	Freight cars	569	105
Owned by shippers or rented to shippers..	{ Locomotives	158	....
	Freight cars	3,263	....

The Central Railway was among the first in Mexico to adopt oil burning engines, and today practically all the Mexican railways use them. There are a large number of storage tanks, and special oil tank cars are used for carrying petroleum from the wells to these tanks.

The number of employés on the railways under government control in Mexico is 31,588, of which only sixty-nine are foreigners. Gross receipts for the year ended June 30, 1918, of the government lines (8,119 miles), amounted to \$29,240,485 United States currency, and the operating expenses were \$19,151,808, net operating income therefore being \$10,088,677.

CHAPTER II

PRIVATE RAILWAYS AND STEAMSHIPS

Southern Pacific of Mexico. Proposed new lines. Difficult construction. Kansas City, Mexico and Orient. Private freight trains. Small American lines. Building a tropical railroad. Curiosities of Mexican railroading. Statistics. Mexico to Japan. New Orleans to Vera Cruz. New York to Tampico. Coastline and ports.

THE tenacity, enterprise and foresight of Harriman resulted in the construction a few years ago of the Southern Pacific of Mexico, which owns approximately 1,000 miles of line in some of the most beautiful country on this continent. This line is the result of the consolidation into a single system in Mexico of the lines controlled by the Southern Pacific system of the United States. The Mexican concession dates from 1905, and carried a subvention of \$10,058 United States currency per mile. This company has virtually absorbed what was hitherto called the Cananea, Yaqui River & Pacific, which had constructed lines from Nogales and Naco on the Pacific-Arizona border to Cananea, a copper-

producing centre in the state of Sonora, and down the west coast of Mexico on the Gulf of California from the port of Guaymas to Mazatlan, continuing to Tepic, from which point it is eventually to go to Guadalajara and Mexico City.

The company suffered considerably between 1910 and 1913, the traffic loss for this period being estimated at \$3,000,000, and the cost of maintaining the property during the same period was \$510,000 in excess of the revenue collected. The road in its progress southward crosses the wealthy regions of the Mayo and Yaqui rivers, which produce the best garbanza (chick peas) in the world. It passes Navajoa, the centre for this product, and then touches San Blas, in the state of Sinaloa, where it connects with the Kansas City, Mexico and Orient. At Manzanillo it connects with the National Railways of Mexico.

The Southern Pacific of Mexico runs tri-weekly trains from Nogales to Naco via Cananea, 120 miles, but the property of the railroad in this section has greatly deteriorated, owing to the fact that it has been compelled on several occasions to withdraw all trains and practically abandon the roadbed. All the bridges have been destroyed, and all rolling

stock, roadbed, terminals and buildings will have to be renewed at an early date. At one point on this line, between San Blas and Culiacan, H. J. Temple, the general superintendent, rebuilt a bridge nine times. Every time the bandits destroyed it, Temple rebuilt it. A pile driver outfit was maintained at the bridge all the time, and in one month the bridge was rebuilt five times. The Southern Pacific of Mexico is compelled to operate armoured cars on all trains.

A glance at a railway map will show the small portion of the route between Tepic and Guadalajara which is still to be completed. The intervening distance is only a few miles, but it is in the difficult Sierra Madre country, requiring a number of tunnels—one of them nearly three miles in length—and much heavy grading. Representatives of the Southern Pacific are now in the field arranging for the early completion of the line. When this is done the Southern Pacific will have a direct connection between its great system in the United States and the entire west coast of Mexico—a region immensely wealthy in agricultural and mineral products.

Difficulties of Construction

The difficulties which will have to be overcome by the American engineers in completing this short stretch between Tepic and Guadalajara are graphically illustrated by the description of the survey made under exactly similar circumstances of the Cañon de Tamasopo on the Mexican Central by Max E. Schmidt, an American engineer. "This cañon is eighteen miles long, with perpendicular cliffs many hundred feet high on both sides.

"When the first surveys were made, the cañon was devoid of roads or trails. The sun hardly ever penetrated the rockbed where the engineers camped, and where a sudden rain in a few hours might create a torrent that would fill the bottom of the cañon from side to side many feet deep, and carry away every vestige of the camp outfit and survey. At night, the noise of the rocks becoming detached from the cliffs above and falling into the cañon made sleep a succession of nightmares. When the actual location was made it was found that, in order to obtain proper grades, the road would have to intersect the cliffs at about half their heights. Difficulties then began in earnest. On many days not over 100 feet could be staked. All camp

comforts had to be abandoned and night would find the engineers camping on the cliffs, near the last stake, swinging their hammocks over rocks and precipices and securing what little rest they could. The roadbed as now finished is nearly all carved out of the solid rock. The total track curvature is 12,248 degrees, and in the aggregate only about one-fifth of the distance is on tangents."

Another American Line

A gigantic monument to the pluck and resourcefulness of American engineers is the Kansas City, Mexico & Orient, running from Kansas City to the Bay of Topolobampo on the Pacific Coast of Mexico, a total of 1,451 miles. It was promoted by Arthur E. Stilwell, who carried large parties of prospective stockholders from the western states, and in this way sold enough stock to carry on the construction work. The company was incorporated in 1900 under the laws of Kansas. Two sections are still under construction—one between Alpine, Texas, and the Rio Grande, eighty-one miles, and the other between Sanchez, in the state of Chihuahua, and Los Hornillos, in Sinaloa, 198 miles.

This line also taps large agricultural and min-

ing districts, it being estimated that there are about 500 mines and prospects on the line, as well as important haciendas producing sugar, cattle, grain, timber and fruit. Owing to bandit activities, service is at present irregular on the stretch of line from the Rio Grande to Sanchez, 287 miles.

The construction of this line is all first class, rails of seventy-five pounds weight, ties of California redwood, tarred, bridges well piled and provided with safe approaches and abutments. On the first hundred kilometres of the line, starting from the Pacific terminus at Topolobampo, there is but one bridge of any importance, namely, that crossing the Fuerte River, comprising three truss spans, each measuring 300 feet in length. Several smaller bridges are from 15 to 50 feet in length. On the second division, from Chihuahua east, however, when the Sierra is reached, the country becomes difficult to negotiate. In this long section tunnelling has been both expensive and difficult, the longest of the excavations being 1,520 feet, while there are two others which measure 810 feet. East of Chihuahua there is a bridge across the Chuviscar River near Aldama, consisting of ten spans of fifty feet deck girders on concrete piers and abutments. Further on, crossing the Con-

chos River, there is a steel girder bridge which is comprised of seventeen spans of fifty feet deck girders.

The length of the main line in Mexico, from the Rio Grande to Topolobampo, is 633 miles, which distance includes a portion of the Chihuahua & Pacific Railway, from Tabalaopa to Minaca, 120 miles, operated under lease. The terminus of the line at the bay of Topolobampo is a magnificent port, completely mountain-locked, measuring about seven square miles in area, with a depth over the bar at the entrance at low tide of about twenty-two feet.

Privately Operated Trains

A large part of the freight in Northern Mexico is today handled in privately operated trains, of which there are about thirty in service. American mining companies have agreed to rebuild a part of the destroyed cars on condition that such cars are to be used exclusively by them for a period of two years, after which they revert to the regular equipment of the service. From the American border to San Luis Potosi, 475 miles, on the government railways, shippers are dependent on private trains for quick service, freight being delivered in about

ten days, at rates 50 per cent. higher than the regular government rate. As freight is not received on private trains in less than carload lots, shippers of smaller quantities who require regular quick service must ship by express or pay insurance. There are special express trains leaving Nuevo Laredo on the Rio Grande for Mexican points twice a week.

An effort is being made at the present time to bring about an agreement with the United States Railroad Administration for the through billing of freight from points in the United States and Mexico, and for the regular interchange of cars. Through billing has been discontinued since 1915. American owned freight cars are, however, going across the border into Mexico under bond furnished by the shipper, and bond is released as soon as the car is returned to the United States. There are at present about 500 American owned freight cars in shops and in service in Mexico.

Extension of Lines

When I left Mexico City on May 7 the extra session of the Mexican Congress had completed its organization, and was starting to work on the big questions which it is now compelled to

deal with. One of the most important of these is the extension of the railroads of the country, as recommended by President Carranza, and the purchase by the government of all or a majority of the stock of the United Railways of Yucatan. This company was incorporated under the laws of Mexico in 1902, and is a system formed through the consolidation of lines formerly independent and then owned by henequen (hemp) planters of the peninsula of Yucatan. There are four divisions: the Northern, between Merida, the capital of Yucatan, and Progreso, its seaport, and between Merida and Izamal, all standard gauge; the Eastern, between Merida and Valladolid, with two branches, all narrow gauge; the Western, connecting Merida with Campeche, capital of the state of the same name, and two branches, all narrow gauge; and the Southern, between Merida and Peto, with one branch, narrow gauge.

Since 1914 the Yucatan railways have been operated by the local government of the State of Yucatan. The share capital is 23,000,000 pesos (\$16,500,000), in addition to which there is an issue of \$4,125,000 first mortgage 5 per cent. redeemable gold bonds issued in London. At the time of my visit to Yucatan on May 12 there were 500 miles of railway operating on

schedule time. Track was in good condition, but rolling stock was badly in need of repair.

Three new lines are proposed for Yucatan. The first would link the Yucatan system with the territory of Quintana Roo, running through Peto, Yucatan, Bacalar and Santa Cruz. Surveys for this line were made under the rule of Porfirio Diaz. The second extension, also proposed by Diaz, would connect Santa Lucrecia, in Vera Cruz, to Campeche, connecting with the National Railway of Tehuantepec across the isthmus. The third proposed line will run from some point on the Southern Pacific, between Magdalena and Hermosillo, to Ensenada, the capital of Lower California. The completion of these lines will enable troops to be transported by rail from any part of the country to Lower California without entering the United States.

The American Smelting and Refining Company is also planning the construction of a new line to be operated in connection with its extensive mines and smelters in the states of Chihuahua and Durango, and will expend some \$5,000,000.

Smaller American Lines

Another American owned line is the Mexican Northern, with offices at 82 Beaver Street, New York, which has a total track of seventy-eight miles and runs from Escalon, in Chihuahua, to Sierra Mojada, connecting that region with the Mexican Central. This line is now under the control of the Mexican Government. The Mexico Northwestern Railway, incorporated in 1909 under the laws of Canada, with offices at 115 Broadway, New York, was formed for the purpose of providing northern Mexico with railroad facilities. It has 476 miles, and is still privately operated. It owns the following lines: The Chihuahua & Pacific (incorporated in 1897 in New Jersey), the Sierra Madre & Pacific, a lumber line, and the Rio Grande Sierra Madre & Pacific, which owned several lines in Sonora and Chihuahua—all rich in agricultural, mineral, and forestry resources.

The Parral & Durango Railway was incorporated in Colorado in 1898, and runs from Minas Nuevas, Chihuahua, to Paraje Seco, Durango, fifty-nine miles, with a short branch line to Parral. The head offices of this line are at Pittsburgh. The Potosi & Rio Verde, narrow gauge, is another American enterprise, with of-

fices at 82 Beaver Street, New York. This runs from San Luis Potosi to Ahuacatal, thirty-eight miles, and is at present under the control of the Mexican Government.

Building a Tropical Railroad

It was a Kansas City man, Dennis W. Hedrick, who built the bridges on a line which crosses more rivers and streams than any other railway on the North American continent. This was the Vera Cruz & Pacific Line, completed in 1903, and now part of the Mexican Government railways, extending from Vera Cruz to Santa Lucrecia, a station on the National Tehuantepec, midway between the Gulf of Mexico and the Pacific. The distance was only 242 miles, but the road crosses six large rivers and numerous streams, which necessitated the building of 300 steel bridges. The largest of these crosses the Papaloapan River at El Hule, the superstructure consisting of five spans, each 170 feet in length, a draw span of 225 feet and two steel approaches of 245 feet each, making a total length of nearly one-third of a mile, and consuming 1,250 tons of steel.

Curiosities of Mexican Railroading

There are a number of reasons, other than those relating to natural obstacles, which make railroad building in Mexico expensive. The peculiarities of the Mexican peon is one of these. During the construction of a line in the South thousands of wheelbarrows which were imported for grading purposes had to be thrown away because the peons would not use them unless permitted to take the wheels off and carry the bodies on their backs.

Government requirements for the construction of new railways have also in the past caused large unnecessary expenditures. When I was travelling on the Mexican Railway from Mexico City to Vera Cruz on May 8 I was informed that the cost of the road had averaged \$136,000 per mile—probably the most expensive railroad in the world—and that while only 264 miles long it had taken twenty years to build the road. A little inquiry soon cleared up the mystery. The government in granting the concession had insisted that the railroad be constructed from both terminals simultaneously. Notwithstanding the vehement protests of the English contractors, they were compelled to transport rails, parts of locomotives and other machinery on

mule-back or carts over 250 miles inland, over rugged mountains, some of them over 8,000 feet high, and then the track had to be laid backwards to meet the section which was working up from the coast.

Some Statistics

That the freight and passenger traffic of Mexico is growing, despite bandit and rebel activities, is evidenced by the statistics of transportation of commodities on the railways under government control—representing only 8,119 miles—for the year ended June 30, 1918. Here are the figures, in metric tons: Forestry products, 393,968 tons; agricultural products, 1,236,719 tons; animals and animal products, 216,443 tons; inorganic products, such as lime, cement, asphalt, coal and coke, oil, minerals, etc., 1,935,105 tons; general merchandise, 372,475 tons. For a country containing a population of only 15,000,000, of which a very large percentage are Indians and half-breeds living under the most extreme primitive conditions, a country which, moreover, has been torn up by nine years of revolutions, these figures are remarkable.

Shipping Facilities

Prior to the European war, the Japanese vessels that plied between Japan and the United States and Mexico touched only at Pacific coast ports. A new service has now been inaugurated, the vessels going directly from Japan to San Francisco, thence to Mexican ports and then to Panama. Passing through the canal, they will then call at Vera Cruz and Tampico and afterwards proceed to New York, making the return trip in the order named.

Arrangements have been made for the establishment of steamship traffic between Victoria, B. C., and ports on the west coast of Mexico. At present it is necessary to tranship all freight for Mexican ports at San Francisco, but assurance has been given by the company that if sufficient business develops to warrant it, a direct steamer will be put on the route, which will eliminate the delay at the place named. The cargoes from Vancouver are expected to consist of paper pulp, canned salmon, lumber, coal, etc. On the other hand there is a demand in British Columbia for numerous Mexican products, such as coffee, tobacco, rubber, vegetable oils, fibres, hard woods, fresh and dried bananas, and other tropical products.



DRAWBRIDGE AT SALINA CRUZ



ELECTRIC CRANES AT SALINA CRUZ

100

Within a short time the steamship service which formerly existed between Guaymas and Salina Cruz will be renewed. Four vessels are now being overhauled for the restoration of this service, which will be most important to the Pacific littoral and which will emphasize the value of the Tehuantepec Railway as an inter-oceanic system. The steamship company has sent a financial representative to the Central American countries to solicit business for the new line.

The National Navigation Company of the Pacific has resumed the operation of its vessels between various points on the West Coast. Guaymas and Manzanillo are the terminal points and calls will be made at Santa Rosalia, Las Peñas, La Paz, Mazatlan, San Blas, etc.

The Mexican Fruit Steamship Co. has resumed the operation of its vessels between American ports and those on the eastern coast of Mexico, including Matamoros, Tampico, Vera Cruz, Puerto Mexico, Frontera and Progreso. The operation of this line had been suspended because of the war, and as a consequence, the banana growers of certain portions of Mexico had been prevented from marketing their crops.

There is now a regular steamship service between New Orleans and Vera Cruz, and between

New York and Vera Cruz and Tampico, stopping en route at Havana and Progreso, Yucatan.

Coast and Ports of Mexico

Mexico has a coast line of 1,400 miles along the Mexican Gulf, 327 miles on the Caribbean Sea and no less than 4,574 miles on the Pacific Ocean, including the Gulf of California between the peninsula of Lower California and the Mexican mainland, measuring indentations.

On the Gulf of Mexico the chief ports are: Matamoros, Tampico, Tuxpan, Vera Cruz, Puerto Mexico (Coatzacoalcos), Frontera, Campeche, and Progreso.

On the Caribbean Sea there are two ports of entry: Ascension and Espiritu Santo, also Payo Obispo for government transports.

On the Pacific side there are the ports of Guaymas, Topolobampo, Altata, Mazatlan, San Blas, Manzanillo, Acapulco, Puerto Angeles, Salina Cruz, Tonala, and San Benito, on the mainland, and Ensenada and La Paz on the peninsula of Lower California.

CHAPTER III

OIL INDUSTRY

Who's who. New developments. Submarine deposits. Rentals. Evolution of industry. Location of fields. Varieties of fuel oil. Output of each company. Exporting companies.

"MINES of liquid gold" some one has truly described the oil fields of Mexico, which in the year 1918 produced 63,828,326 barrels of petroleum, each barrel containing forty-two gallons. Although oil was first exploited in Mexico as far back as 1857, the industry as we know it today really began in 1900, when E. L. Doheny and C. A. Canfield, both Americans, began work in the State of San Luis Potosi near the Vera Cruz boundary, at Ebano. In that year they purchased a large tract of land, and in the spring of 1901 built the first modern oil well drilling plant in Mexico. Drilling operations started on May 1 and on the 14th the Mexican Petroleum Company, the concern organized by Doheny and his associates, completed their first successful oil well. Other wells were drilled in rapid succession, a contract to sell oil to the

Mexican Central Railway was arranged, and in 1905 deliveries were being made to that railway at the rate of 6,000 barrels a day. Then Doheny and Canfield opened up the Casiano district, on which property they drilled the world's greatest producer, known as Casiano No. 7, the total production of which to September 11, 1917, amounted to 61,580,000 barrels, to which it has since added 600,000 barrels monthly.

"Who's Who" in Mexican Oil

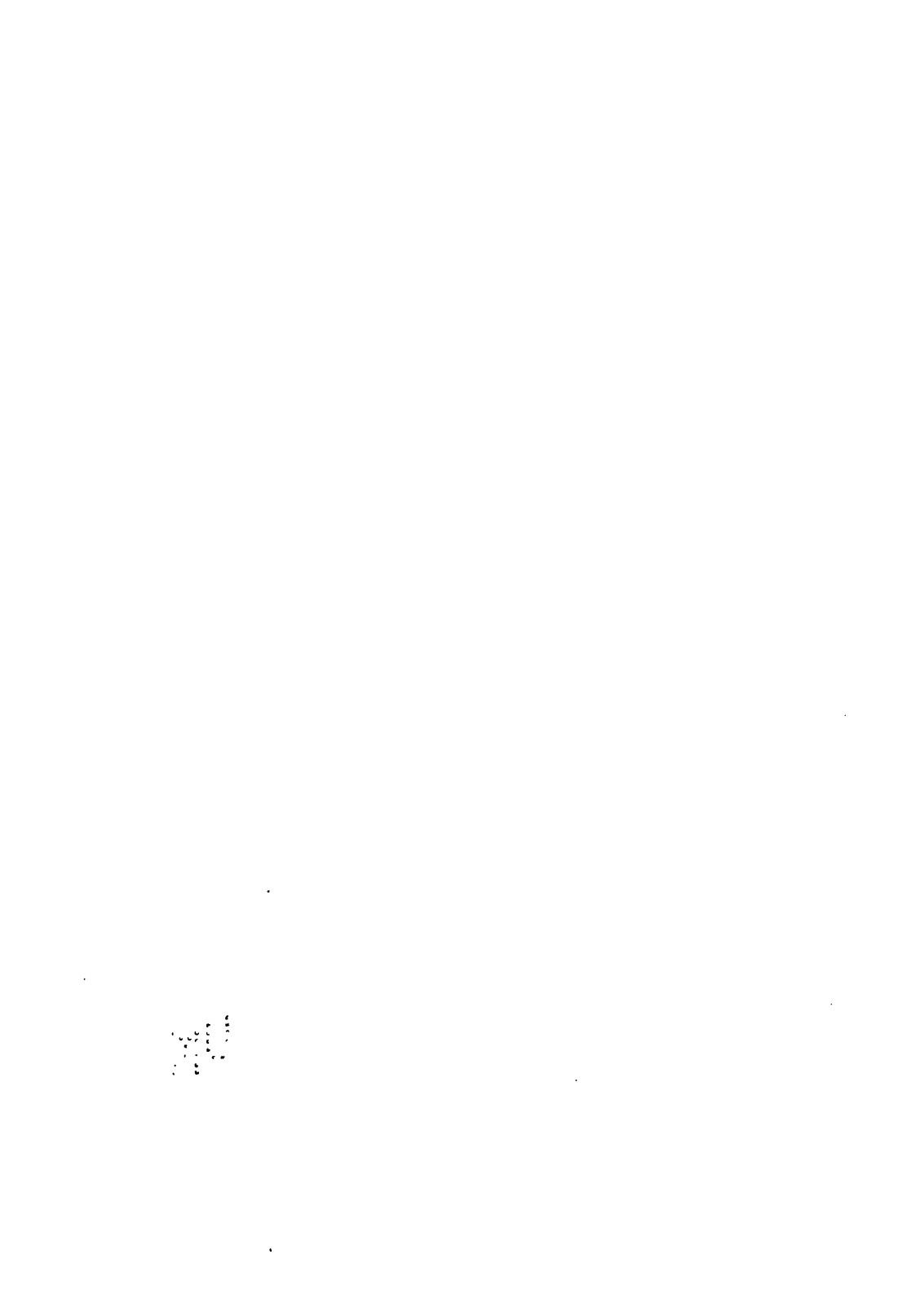
The Mexican Petroleum Co., Ltd., and its subsidiaries (the Doheny interests) are at present the largest producers, and best equipped as regards camps and facilities for transportation and storage. Their product is sold mostly in bulk to American companies along the Gulf States, although a good trade is also done with Brazil. In recent years this company has undertaken to market its products in the United States, and has established distributing depots in New York and on the Mississippi River near New Orleans. The output of the Doheny organizations for last year was as follows: Huasteca Petroleum Co. (Mexican Petroleum Co., Ltd., of Delaware) produced 20,186,459 barrels in 1918, compared with 17,325,171 barrels. Its allied



OIL DERRICK IN TAMPICO OILFIELD, HAUSTECA PETROLEUM
COMPANY



"STRIKING OIL." CERRO AZUL WELL OF THE HUASTECA
PETROLEUM COMPANY



company, the Mexican Petroleum Co. of California, produced 1,445,977 barrels, against 1,125,702 barrels.

Next in importance to the Doheny organization is the Mexican Eagle Oil Co., Ltd. (El Aguila), of which Lord Cowdray is the principal owner. This is the concern in which the Royal Dutch Shell has purchased a large interest. El Aguila produced 16,910,646 barrels in 1918, compared with 16,922,323 barrels in 1917.

Several new companies have recently entered the field, including the Cia Mexicana de Petroleo, La Libertad (Island Oil & Transport Corporation), and the Cortez Oil Corporation (Port Lobos Petroleum Corporation). The companies with an output in excess of 500,000 barrels were as follows: Penn Mexican Fuel Oil Co., 6,854,081 barrels in 1918, against 4,129,297 in 1917; Freeport & Mexican Fuel Oil Corporation (Sinclair Gulf Corporation), 4,119,654 barrels, against 4,076,982; East Coast Oil Co., 3,457,236 barrels, against 3,143,221; Cortez Oil Corporation, 2,161,757 barrels; Mexican Gulf Oil Co., 1,728,190 barrels; La Libertad, 1,550,-869 barrels; Mexican Petroleum Co. of California, 1,445,977 barrels; Texas Co., 1,279,747 barrels, against 2,315,433; Cia Petroleo Tal Vez (Southern Oil & Transport Corporation), 1,152,-

064 barrels, against 989,561; International Petroleum Co., 609,734 barrels, against 619,828; Tampascas Oil Co., 578,479 barrels, against 174,925; Panuco Boston Oil Co. (Atlantic Refining Co.), 531,511 barrels, against 828,067.

At the present time there are 155 petroleum companies in operation in Mexico, though the actual production is confined to a few large companies. The potential daily production of Mexican oil fields on February 28, 1919, was 1,592,740 barrels, but owing to lack of transportation facilities the actual production was only 174,872 barrels daily, or 10.98 per cent. of the potential production. There is no difficulty in getting the oil from the wells to the coast, as they are located near shipping points, and all the big producers are provided with pipe lines, there being over five hundred miles of such lines in the comparatively limited area in which are included the greater number of the producing wells. Ocean transportation is the difficulty, and this is being met by the construction of oil carrying steamers as rapidly as possible. The number of wells drilling on February 28, 1919, was 114, and on the same date there were 299 productive wells. These figures compare with 141 wells drilling and 339 productive wells on December 31, 1917.

During the month of June, 1919, over 150 tank boats left the ports of Tampico, Tuxpan and Lobos carrying in the neighbourhood of eight million barrels of oil. The July, 1919, shipments were about ten millions of barrels.

New Developments

The Huasteca Company now has 361 kilometres of pipe line, the Aguila has 343 kilometres, the Mexican Gulf 100 kilometres, and the Oil Fields of Mexico 89 kilometres. New shipping stations have been completed during the past year, vessels lying off shore and receiving their cargoes of oil by means of submarine pipes.

The Corona Company, a subsidiary of the Royal Dutch Shell, is constructing at Tampico what will be the largest and most modern refining plant in Mexico. The capacity of the refinery will be from 5,000 to 6,000 barrels daily. Another company, a new one, is also planning an extensive refinery. During the past three months seventy new wells were commenced in the Tampico region, four of which opened up with large productions. The exportation of oil shows a constant and steady increase, the only obstacle to definite expansion being the lack of sufficient ships, though this is now being rem-

edied by the release of vessels that had been engaged in war activities. During the year 1918 there was received at New Orleans alone petroleum from Mexico of a value of some \$40,000,000.

The Mexican Government recently dispatched an engineer to make a study of the petroleum indications in the State of Colima. He has now reported that he has discovered petroleum indications of great richness in the vicinity of the Hacienda de Santa Rosalia, surface indications of seepages, etc., covering many square miles of territory, while the geological formations were similar to those of the developed petroleum regions elsewhere.

Another Mexican government engineer reports the discovery of important deposits of petroleum near the port of Altata on the Gulf of California in the State of Sinaloa. Applications for concessions to exploit these discoveries are now being made. These new discoveries are on the same parallel of latitude with the deposits on the coast of the Gulf of Mexico, and indicate the presence of oil right across the republic. On one of the islands of the coast near Altata a natural geyser of petroleum has been discovered.

Other deposits have been discovered in the

State of Chiapas, and the Mexican Government has appointed a commission of experts to make a geological survey.

The first discovery of a deposit of paraffine on the American continent has been made recently in the State of Chihuahua, not far from the border. The bed has been traced for ten kilometres in extent, and analyses of samples show 93 per cent. of the pure mineral. Petroleum with a paraffine base has also been discovered in the same region. The greater portion of the oil produced in California, the south-western portions of the United States, and also in Mexico, has an asphalt base. It is that with a paraffine base that produces a good grade of illuminating fluid. Oil has also been discovered in the elevated region of the State of Durango, on the eastern slope of the Sierra Madre.

The Lorena Petroleum Company has recently brought in a new well which produces upwards of 12,000 cubic metres of oil daily. A new well was also brought in at Panuco, Vera Cruz, having a capacity of 16,000 cubic metres daily, or about 100,000 barrels. The well spouted over 100 feet in the air and the surrounding land was flooded with petroleum before it could be controlled by the valves and pipe line provided for just such an emergency. A new well with

a capacity of 30,000 barrels daily was reported to have been brought in recently at Tantoyucan, Vera Cruz.

Submarine Oil Deposits

Announcement has been made that the Mexican Government will issue a concession for the exploitation of the petroleum deposits that are known to exist beneath the waters of the Gulf of Mexico. Geological study and exploration have demonstrated the indication of large quantities of oil off the eastern coast, which will prove a great economical addition to the oil regions. It is claimed that the exploitation of submarine oil is cheaper than the sinking of wells on land.

A contract has been made for the sale of 50,000,000 barrels of petroleum to an American company for use on railways in the United States. This is said to be an initial order. Papers filed in Mexico City reveal the organization of the Mexican-Belgian Petroleum Company with a capital of \$4,000,000 American money. The company is negotiating for a large area of petroleum lands in the northern portion of the State of Vera Cruz. One can readily understand the eagerness of foreign investors to

engage in the petroleum industry in Mexico when the Aguila Company is paying 25 per cent. dividends and the Royal Dutch Shell is distributing dividends ranging from 37 to 48 per cent.

Rentals Paid for Oil Lands in Mexico

Official figures regarding the amounts paid to owners of oil lands as rentals have been compiled by the Secretary of Industry and Commerce of Mexico, and show the following:

Twenty-four companies pay no rent, owning their land in fee simple.

Fifty-four companies pay an annual rental of less than five pesos (\$2.50) per hectare ($2\frac{1}{2}$ acres). These companies occupy nearly seven-eighths of the oil lands under operation. The total area rented by them is 3,325,490 acres, out of a total of 4,064,870 acres. On this they pay annual rentals amounting to \$589,324 American money, or a little over $10\frac{1}{4}$ cents per acre.

Twenty-two companies pay annual rentals of less than \$10 per hectare upon 138,340 acres, amounting to \$166,254 American money.

One hundred and twenty-two companies pay more than \$10 per hectare. They occupy 175,087 acres and pay a total annual rental of \$2,443,457 American money.

The total area occupied by all the companies is 4,064,870 acres and the total annual rent is \$3,449,033 American money.

Several companies pay very high rentals, which serve to increase the average. One pays \$4,166 American money per hectare, another \$1,837, another \$2,016, while several pay from \$500 to \$1,000.

Exports of crude petroleum and refinery products from Mexico in 1918 amounted to 7,677,278 metric tons, valued at \$70,278,776 American money, compared with 6,426,036 tons valued at \$26,838,063 American money, in 1917. The increase in value reflects the higher prices that were paid for Mexican oil. The United States share of the Mexican oil exports in 1918 was 73 per cent.

Evolution of the Oil Industry

In 1857 a group of individuals, mostly merchants, in the village of Macuspana, Tabasco, entered into an agreement that each should furnish "a hundred loads of cacao" with which to procure "sheets of forged iron" to be used in the making of receptacles for the storage of "illuminating oil" that flowed with the water from a spring near the village and which the natives used for illuminating purposes.



MEXICAN DWELLINGS IN TAMPICO



AMERICAN DWELLINGS IN TAMPICO

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These merchants obtained within a short time great profits from the enterprise, and as they could not dispose of all the oil at the locality of its source, they visited for this purpose the neighbouring cities. Thus it can be seen that even if only as a beginning on a very small scale, oil was already being exploited in Mexico as far back as 1857.

After a lapse of eight years, in 1865 a permit was granted by the Federal Spanish Government to a Spaniard, Ildefonso Lopez, to exploit the deposits of bituminous and oleous substances at San Jose de las Rusias, State of Tamaulipas, a place not far from Soto de la Marina, in the eastern portion of the State named.

The Spaniard, Lopez, dedicated himself almost wholly to the exploitation of the "pitch" or asphaltum which abounds in those regions, and also, like his predecessors, the mineral oil that flowed spontaneously.

In view of the good results obtained by him, a group of Mexican planters organized a company which bore the name of "The Development Company of the Gulf of Mexico." Even if the constitution of this company indicated that the ostensible object of its activities was, among others, the extraction of coral from the shoals

near the coast of Sotavento, it really dedicated itself exclusively to the exploitation of the petroleum fields located near Furbero, Papantla, State of Vera Cruz. However, the financial object of this enterprise was never attained, in spite of the most rational and scientific methods employed in the operations, because once the capital invested had been exhausted, no new oil indications appeared, and the organizers abandoned the project, notwithstanding the fact that in the localities concerned there were places where oil covered the surface of streams.

As a result of this, in 1878, after several years of neglect, Dr. Autrey, who was exploring those regions, came upon the abandoned works and staked his claim upon the springs. Immediately after he had secured the permit, he endeavoured to organize a company for the purpose of exploiting them. Notwithstanding great efforts, he failed in his object, and thereupon made a special trip to the United States in order to offer for sale, to one of the petroleum companies that were then operating in California, what he pompously called his "mines of liquid gold in Mexico." Nevertheless, he did not succeed in attaining his object.

From this time down to 1883, we have nothing

sure that could serve to indicate the progress of the activities undertaken towards the exploitation of petroleum. In that year there was organized at San Juan Bautista (now Villahermosa), capital of the State of Tabasco, a company with a capital of one million pesos, of which Señor Simeon Sarlat, Governor of Tabasco, was president. This company had for its object the exploration of the petroleum springs near Macuspana, the existence of which was presumed on account of the exterior indications to which we have already referred. The location for the wells was chosen in an ill-advised manner, and by preference near the pitch or asphaltum mines, which abounded in this region, and the drilling operations were begun at the place supposed to be best suited for it, located at a small farm which was then the property of Señor Sarlat, and very near the place where Pearson now has established the most important camp in the State. However, all was in vain; and the funds of the company were exhausted without obtaining positive results. This discouraged and misled the operators to such an extent that they completely stopped all work, even that which was necessary for the removal and collection of the machinery,

which, exposed to the rigours of that climate, was soon converted into heaps of rusty and useless iron.

Almost simultaneous with this undertaking, the famous English empire builder, Cecil Rhodes, was asking for a corresponding permit for the exploitation of the carbides of hydrogen in the subsoil of a great extension of land located in the district of Papantla, State of Vera Cruz, for which purpose he had gathered together, in New York, a group of foreign capitalists, who, in view of the fabulous accounts that were circulated regarding the importance of the oil indications in Mexico, undertook an enterprise that was to be dedicated to the exploration and exploitation of Mexican oil, conferring the local management upon Rhodes. This organization was called "The Mexican Petroleum and Liquid Fuel Company," and like its predecessors in the same line, it failed after using up a considerable capital; and like the one organized at Tabasco, it abandoned its machinery.

After this succession of failures there came naturally a period of pessimism regarding the oil industry in Mexico. This lasted until 1900, when the American capitalists, E. L. Doheny and C. A. Canfield, began work in the State of San Luis Potosi.

Location of the Fields

The chief Mexican oil fields can be grouped in five districts:

I. The Ebano district, about forty miles west of Tampico, largely the property of the Mexican Petroleum Company. The oil has a heavy percentage of asphaltum, and averages about twelve degrees Baume (0.986 specific gravity).

II. The Panuco district, including the Topila Region; also producing a heavy oil averaging about twelve degrees Baume. According to V. R. Garfias, oil of such density cannot be economically transported by pipe lines.

III. The Huasteca district south of Tampico, in which the famous "Casiano," "Cerro Azul," and "Potrero del Llano" wells occur. This oil is lighter than the Ebano and Panuco grades, averaging from nineteen degrees to twenty-one degrees Baume (from 0.9395 to 0.9271 specific gravity), and thus admits of being transported in pipe lines. "Dos Bocas No. 3" and "Potrero del Llano" belong to the type of well-known "gushers" and have each produced at the rate of as much as 100,000 barrels a day. Even higher figures have been given for short periods.

IV. The Tuxpam district, including the Fur-

bero region, southwest of Tuxpam. The oil from this district is, as a rule, much lighter than those of the more northern fields.

V. The Tehuantepec-Tabasco district, still further to the south and east in the neighbourhood of Minatitlan, where the Pearson interests have a refinery.

The petroleum zones of Lower California and those in the north of Mexico are still unexplored. The Panuco region is characterized by three essential points—the minor depth at which the oil deposits are reached (600 to 800 metres), the relatively few failures in the drilling of wells in that region, and the short duration of the production of the wells. The Tuxpam region, on the other hand, has shown signs that the deposit from which the oil is extracted, which is of dolomite lime, is more extensive, as shown by the long periods of productivity of its wells. The Tabasco-Chiapas region, although it has not produced considerable quantities so far, has a splendid future on account of the magnificent quality of its products, which have bases of paraffin, very light, and containing enormous proportions of illuminating oil. The deposits discovered on the Isthmus of Tehuantepec up to date have been reached at comparatively minor depths.

Great Variety of Types of Fuel Oil

Much misunderstanding with regard to the statistics concerning the export of petroleum from Mexico is due to lack of information with regard to the various grades of so-called "fuel oil" likely to be included in the shipment. Specifications for heavy oil to be used as fuel are given in a pamphlet issued by the Bureau of Mines, entitled "Heavy Oil as Oil for Internal Combustion Engines," by Irving C. Allen, Washington, 1913. The following easily attained requirements, drawn from this authority, are significant as admitting a great variety of grades, while more recent specifications are even broader:

1. Oil is available for engines if mobile at 0 degrees F.
2. Sluggish oils are available if heated before being introduced into the engine.
3. Four per cent. of material insoluble in xylene, and 3 per cent. of coke residue may occur without disqualifying the oil.
4. The flash-point may vary from sixty degrees to 100 degrees C.
5. The Maximum specific gravity is .92, which admits at once many grades of oil.

6. The heavier oils can be mixed with a small amount of lighter oil (2 per cent. of "gas oil" is usually enough), and thus be made available.
7. Sulphur may occur up to 0.75 per cent. (Recent United States specifications admit 1½ per cent.)
8. Paraffin may occur up to 15 per cent.
9. Asphaltum may occur up to 15 per cent. and even more.

These specifications make available a great many types of Mexican fuel oil, inasmuch as virtually all mobile crude oil can be burnt in the modern heavy-oil engine. Asphaltum oils containing as much as 20 per cent. of asphaltum have been burnt in certain types of the Diesel high-compression engine. It is usual, however, to distil the heavier grades until the tar residues and cokes are segregated, and to use a special ignition oil of a low flash-point for starting the engines. When the sulphur content is too large, according to the specifications, the per cent. can be properly lowered by the admixture of oil with a smaller sulphur content. As a matter of fact, lighter oil is nearly always mixed with the heavier Mexican oils before they are used as fuel.

One ton (2,000 pounds) of ordinary bitumi-



SCHOOLHOUSE ESTABLISHED BY HUASTECA PETROLEUM
COMPANY AT TAMPICO



RAILWAY STATION AT SAN LUIS POTOSI

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nous coal has been estimated as equivalent to 3.6 barrels of oil for railroad purposes, and, according to one steamboat test, to 3.5 barrels. Steaming coal contains 7,500 calories per gram, while the average Mexican fuel oil, when properly mixed for use, would contain about 10,500 calories per gram. Moreover, one ton of ordinary steaming coal occupies forty cubic feet, while one ton of fuel oil occupies thirty-five cubic feet. If the high efficiency of Diesel engines is introduced as a factor, the ratio in the value of fuel oil to coal is five to two; whereas, for naval purposes, which include the consideration of bunker space, the ratio has been estimated to be as high as four to one.

It is useful in this connection to know the principle of operation in a Diesel engine. The fuel oil is sprayed into the cylinder, where, instead of exploding as in gasoline engines, it simply ignites, as a result of the heat of air compressed at the rate of from 500 to 800 pounds to the square inch. One pound of oil used in the Diesel engine equals two and one-half pounds used for a turbine, and four pounds of ordinary coal used for steam production. The Diesel engine is constantly being developed and improved, and will undoubtedly increase from year to year the use of heavy Mexican oil.

**LIST OF OIL PRODUCING COMPANIES IN MEXICO AND OUTPUT OF EACH IN THE YEARS 1918
AND 1917**

Companies	1918		1917	
	Barrels	Tons	Barrels	Tons
Cia. Pet. La Victoria .....	.....	.....	1,574	245
Topila Petroleum Co. ....	.....	.....	2,000	307
Cia. Mex. Pet. del Golfo .....	.....	.....	29,933	4,985
National Oil Co. ....	.....	.....	753,639	117,933
Panuco Pet. Mat. (Royal Dutch)	2,748	427	.....	.....
Cia. Exp. de Pet. La Universal	3,075	477	.....	.....
Mexican Oil Co.	3,490	535	288,770	44,345
Hispano Mexicana (Tex. Mex. Fuel)	4,226	665	29,873	134
Mexico y Hispania	5,469	849	29,625	4,608
Cia. Pet. Monterrey (Royal Dutch)	25,021	3,835	24,958	3,850
Chiapas Oil Ltd. (Royal Dutch)	25,286	3,831	1,615	230
Oil Fields of Mex.	29,906	4,208	34,628	4,921
Veracruz Mex. (Standard Oil N. J.)	51,716	8,963	360,258	56,366
La Petrolera Pobiana (Standard Oil)	91,311	14,046	32,871	6,061
La Cia. Mex. de Combustible (Pierce Oil)	300,084	45,878	60,882	9,255
La Corona (Royal Dutch)	337,803	52,122	740,576	114,747
Transcontinental de Petroleo (Standard Oil, N. J.)	382,029	53,781	119,315	18,611
Panuco Boton Oil (Atlantic Refining)	531,511	82,007	828,067	120,073
Thompson's Oil Co.	578,478	90,296	174,924	27,340
International Pet. (J. H. Hammond)	608,733	96,145	619,822	96,902
Cia. Pet. Tial Yerz (Southern O. & T.)	1,162,063	179,903	989,661	163,965
Texas Co. of Mex. (The Texas Co.)	1,279,746	197,760	2,315,433	360,772
Cia. Mex. de Petroleo (Mex. Pet. of Cal)	1,445,976	226,997	1,126,702	176,034
Cia. Mex. de Pet. La Libertad (Island O. & T.)	1,650,889	223,927	.....	.....
Mexican Gulf Oil (Gulf Oil Corp.)	1,728,390	256,798	1,180,784	178,318
Cortez Oil Corp. (Por Lobo Pet. Corp.)	2,161,757	315,988	.....	.....
East Coast Oil (Southern Pacific Co.)	3,457,235	538,126	3,163,220	489,116
Freeport & Mex. F. O. Corp. (Sinclair Gulf)	4,119,654	642,926	4,076,982	636,839
Penn Mex. Fuel Co. (South Penn Oil)	6,851,980	896,341	4,128,286	600,823
Cia. Mex. de Pet. El Aguila (Mexican Eagle Oil)	16,910,646	2,481,908	16,922,322	2,480,330
Huasteca Pet. Co. (Mex. Pet. of Delaware)	20,386,459	2,974,439	17,325,171	2,548,480
Totals	63,828,326	9,504,298	55,292,770	8,264,366

**LIST OF OIL EXPORTING COMPANIES IN MEXICO AND SHIPMENTS OF EACH, TOGETHER WITH
EXPORT TAXES PAID, IN 1918**

Companies	Tons		Tons		Totals		Value Mex. Gold	Tax Paid Mex. Gold
	Crude	Refined	Cub. Met.	Tons	Tons	Tons		
Cia. Pet. Tal Vez	16,445	.....	15,723	15,445	92,133	\$ 9,213	\$	\$
New England Fuel	26,062	.....	26,482	26,062	166,577	15,076		
Interocean Oil	76,669	.....	78,303	76,669	491,076	43,863		
National Pet. Corp.	84,953	.....	86,456	84,953	522,276	49,307		
Texas Co., Mex.	184,177	.....	189,710	184,177	1,473,225	139,967		
Pierce Oil Corp.	7,948	186,387	199,233	8,111,923	232,739			
Standard Oil N. Y.	26,528	177,101	289,400	283,629	28,529,487	1,740,376		
Metropolian (Island)	236,732	.....	255,100	236,732	3,566,084			
Mexican Gulf Oil	282,137	.....	275,716	262,137	2,890,780	279,943		
Co Cortes Oil Corp.	285,190	.....	307,689	285,190	4,224,188	422,240		
Union Oil Cal.	31,982	271,164	318,396	302,837	3,285,980	328,098		
East Coast Oil	530,670	.....	640,315	630,670	3,317,630	306,165		
Freeport & Mex.	614,640	.....	626,375	614,640	3,844,886	355,180		
Standard Oil N. J.	344,120	298,542	691,971	642,662	16,014,984	1,203,356		
Penn Mex. Fuel	1,017,573	577,583	1,114,163	1,017,573	14,878,534	1,487,854		
El Aguila Pet.	656,951	1,108,942	1,384,627	1,284,076	31,740,224	1,887,510		
Huasteca Pet.	646,836	.....	1,881,452	1,765,178	21,612,790	2,263,815		
Totals	5,057,566	2,619,721	8,230,268	7,677,277	\$140,567,653	\$11,120,398		
Percentages	65.9	34.1	100	100		7.9		

Note.—Refined oil includes distillate. The total exports in 1917 were 6,426,035 tons, valued at \$63,676,127 (Mex. Gold), and the total export taxes paid were \$4,554,537 or 12.8 per cent.

Out of the total of 7,677,277 tons of oil exported in 1918, 6,405,731 tons, or about 84 per cent., were shipped to the United States. The National Railways of Mexico in 1918 consumed 2,637,543 barrels of oil as fuel. This does not include shipments from the refineries to other government railways in Mexico, or to privately operated railways.

The exports of oil from Mexico in February, 1919, of thirteen companies totalled 4,403,609 barrels, and the same number of companies in March exported 4,307,469 barrels. The total oil exports from Mexico in April, 1919, aggregated 6,254,572 barrels, and in May, 6,897,962 barrels. In June, 1919, Mexican oil exports amounted to about 8,000,000 barrels, and in July they were about 10,000,000 barrels.

CHAPTER IV

MINES

Operations resumed. New enterprises. Japanese invasion. The richest deposits. Coal lands. Statistics.

WHILE there are still many mines shut down in Mexico on account of bandit activities, and a number of those operating are compelled to employ armed guards to protect their property, still the situation is considerably improved, the total exports of minerals for the year 1918 being \$34,716,000 American money, exclusive of oil products. Treasures of incalculable richness lie beneath the surface in every State in Mexico, and although innumerable mining enterprises have exploited the metal-bearing regions for nearly four hundred years, and have extracted fabulous quantities of precious metals, by far the greater part is yet to be laid bare.

During my trip through Mexico, from the Texas border to Vera Cruz, in April and May, many of the mines which had been shut down for long periods were preparing to resume, and a number of new projects were under way. The

large smelter of the American Smelting and Refining Company at Chihuahua, which reopened in April, 1918, after having been closed for two years, continued operations throughout the past twelve months, smelting about 240,000 tons of ore. Most of the mines in Chihuahua are dependent upon this smelting plant, and are not able to run when it is closed. The cyanide plant of the Alvarado Mining and Milling Company at Parral, in Chihuahua, was also in operation during 1918.

Extensions and improvements to the smelter of the American Smelting and Refining Company situated five miles from Chihuahua, made good progress during the past year, including the completion of all the concrete work necessary for the mechanical handling of great quantities of ore. When finally completed this will be the largest smelter in the world, costing \$3,000,000. The San Francisco Mines of Mexico (British) at Parral, Chihuahua, installed and began operating a flotation process mill in 1918. The Cusi Mining Company, an American concern at Cusihuirachic, have started construction on a similar mill for the flotation of its lower grade silver ores.

The principal silver mines of the State of Hidalgo are now in full operation, and the

smaller ones are preparing to resume. The mines of Pachuca, capital of the State, produce more silver than any other single district in Mexico, and have kept up their production throughout the revolutionary troubles with only temporary suspensions for brief periods. It is a remarkable fact that from 1877 to 1912 the silver output of Mexico showed a steady increase from year to year, and that in the seventeen years ending 1913 Mexico produced considerably more than a billion ounces of silver.

In many parts of Mexico mining companies which have been operating on a reduced scale are returning to normal. At the great copper camp of Cananea in Sonora the Greene-Cananea resumed operations in December, 1917. The Moctezuma Copper Company, controlled by the Phelps-Dodge interests, began operating with a full force of miners in August, 1918, at Nacozari, and is steadily increasing its operations at its Promontorio mines, near Lampazos, in the Moctezuma district. The El Tigre silver-gold mine, also in the Moctezuma district, had a large production in 1918. The Las Chispas mine, near Arizpe, resumed work in 1918.

Among those seeking investments at the present time in Mexico are many mining groups, capitalists and engineers, from the United

States and elsewhere. During my stay in Mexico City a party of twenty-five arrived from New York, and after a few days in the capital went on to the mining regions of Jalisco and Guanajuato.

The Japanese Invasion

One of the most significant events from a mining point of view, and one of the greatest possible interest to manufacturers of mining, agricultural, and other machinery, was the arrival in Mexico City in April and May, 1919, of several delegations representing the largest iron and steel plants in Japan, whose intention was announced to be the purchase of the leading iron ore deposits in Mexico. The deposits in which they were particularly interested were those in the famous Iron Mountain near the city of Durango, in the State of the same name. This mountain is 5,000 feet long, 300 to 400 feet in height, the average width being about 1,100 feet, and it is said to range from 60 to 70 per cent. pure ore. The estimated weight of the mass is 600,000,000 tons.

Excavations made at distances of as much as twenty-five to thirty kilometres in any direction disclose the presence of the same iron ore at

varying depths. A branch of the National Railways runs directly to the foot of the mountain, and the ore can be quarried out and loaded by gravity directly into the cars. The nearest coal deposits are in the State of Coahuila, some 600 miles by rail on the same line. Petroleum has recently been discovered within a short distance of the iron mountain, and this may solve the fuel problem.

The next iron ore deposit to which the Japanese will turn their attention is on the coast of the State of Colima, but there is no coal on the west coast, although oil has been found in several locations. Having secured the raw material, the Japanese propose to convert it into pig iron and steel, and this in turn they propose to turn into manufactures of all kinds, especially industrial and agricultural machinery. It is said that they will import Japanese labourers into Mexico, and they claim—certainly not without reason—that they will be able to undersell their American and other foreign competitors. Los Angeles capitalists have also organized a company to develop iron ore deposits in Durango.

The Richest Deposits

Before the revolution Mexico's output of silver alone amounted to 70,000,000 ounces annually. Much of the silver ore found in Mexico is mixed in considerable quantities with gold, copper, or lead. The principal silver camps of Mexico are in the States of Hidalgo, Guanajuato, Zacatecas, Chihuahua, Sinaloa, Guerrero, and San Luis Potosi. Silver mines are also worked in Mexico, Puebla, Morelos, Queretaro, Oaxaca, Jalisco, Durango, and Sonora, as well as in Lower California. Silver exports from Sonora alone for the year 1918 reached \$5,237,000. Silver ore and silver bullion were of about equal importance, with silver concentrates ranking next. Silver exports from the State of Chihuahua for the year 1915 (mines being closed during 1916 and 1917) amounted to 6,445,680 troy ounces, and for nine months of 1918 they were 4,341,376 troy ounces. There are 5,804 silver mines.

Mexico has 988 copper mines. The copper zone of Sonora is the southward continuation of that of Arizona, and extends throughout nearly the whole State. The whole region about Cananea is a copper deposit, most of the large veins carrying copper, lead, gold and silver.

Copper deposits are being opened up in Sinaloa. Coahuila also has large copper resources. Copper exports from Sonora for the year 1918 reached a total of \$15,741,000. Copper exports from Chihuahua for the year 1915 amounted to 38,843 pounds, and for nine months of 1918 they were 15,225 pounds.

There are 1,800 gold mines in Mexico, though the present production is small. Gold-bearing veins are found in Sonora, Sinaloa, Chihuahua, Oaxaca, and Lower California. Gold placers occur in Lower California, Sonora, Sinaloa, Durango and Guerrero. Gold-silver veins are found in Lower California, Sonora, Sinaloa, Durango, Chihuahua, Michoacan, Guerrero, Mexico, Oaxaca, Guanajuato, Zacatecas, Queretaro, and Lower California. There are reefs and veins of quartz, in some of which the gold is 60 per cent. of the value of the ore. In 1910 Mexico produced 5 per cent. of the gold production of the world and 33 per cent. of the silver. Gold exports from Sonora for the year 1918 totalled \$1,355,155. From Chihuahua there were exported for the year 1915 31,691 troy ounces of gold, and for nine months of 1918 9,604 troy ounces.

There are 118 lead mines in Mexico, the chief producing camps being in Durango, Chihuahua

and Coahuila. Silver lead ores with copper are found in Sonora. Numerous lead mines are also worked in Zacatecas, and in one at least when the ore is smelted it averages 35 per cent. lead. The main output of lead comes from the central plateau, where the great camps of Sierra Mojada, Almaloya, Niaca and Santa Eulalia are located. The lead production from the numerous mines in the northeastern States is large, the ore going principally to the smelters of the American Smelting & Refining Co. in Monterey, the lead, as bullion, being shipped to the United States for refining. For the year 1915 exports of lead from Chihuahua amounted to 20,620,885 pounds, and for nine months of 1918 they were 35,715,232 pounds.

Chihuahua is considered the richest State in Mexico in mineral resources, and the leading industry of that State is the mining and smelting of silver, gold, lead, copper, zinc and manganese. It was possible in 1918 to work only those mines located at or near mining camps. Several mines which had been closed for some time reopened during the year, and their output, added to the increased production later in the year of the other mines which were operating, made the total for the last six months about twice that of the first half of the year.

There are seventy-three zinc mines in Mexico, mostly in Chihuahua and Sinaloa. Exports of zinc from Chihuahua for the year 1915 amounted to 5,649,017 pounds. Figures for 1918 are not yet available. Quicksilver is found in four States in Mexico, the exports of quicksilver from San Luis Potosi in 1918 amounting to \$192,719. Antimony is found in seven States, exports of antimony from San Luis Potosi in 1918 amounting to \$96,843. Vanadium is found in five States, bismuth in eight States, selenium in four States, and manganese in seven States, one deposit in the State of Mexico carrying about 44 per cent. manganese. A large deposit of graphite is being worked in Sonora, graphite ore being exported from that State in 1918 to the value of \$224,000, all of it mined at Guaymas.

The district of Piedras Negras is the source of bituminous coal for the whole of Mexico. In the last years of the revolution the coal mines were greatly handicapped on account of confiscation, labour trouble, and the closing of the many smelters throughout the country which consumed their outputs, but 1918 saw the opening of many of the mines that had closed down, and a boom in the opening of those that had been running at half capacity.

The output of the coal mines in the Piedras Negras district has now reached 75,000 tons of coal a month, and will soon be 100,000 tons a month. The making of coke on a larger scale is contemplated. At present there are two mines, the Mexican Coal and Coke Co., and the Cia. Combustibles de Agujita, that are equipped with coking ovens and are making a limited supply of coke.

New York Operators Acquire Coal Lands

Arrangements were recently made by a New York company to lease for ninety-nine years, with option of purchasing at the end of five years for \$5,000,000, the Carlos F. Johnson semi-anthracite coal lands three miles northeast of Ortiz, Sonora. It is proposed to build a thirty-mile extension of the Southern Pacific Railway of Mexico to tap the field, so that tonnage can be sent to the United States through Nogales, as well as through Guaymas up to the Pacific Coast, and down to the Panama Canal.

The Carlos F. Johnson coal land is well known among coal operators in the United States, but for several reasons it was thought impossible to open it. The veins cover an area of thirty-



THE FALLS OF JUANACATLÁN—THE MEXICAN NIAGARA. THERE IS AN ELECTRIC POWER PLANT AT THE FOOT OF THE FALLS WHICH SUPPLIES LIGHT AND POWER TO THE CITY OF GUADALAJARA, WHERE THERE ARE THREE STARCH FACTORIES AND COTTON MILLS. SOME PARTS OF MEXICO ARE RICH IN WATER POWER.



two square miles. There are a number of prospect holes on the property which show coal, but only three distinct shafts to depth. The most important of these is the shaft at El Salto, which is down 400 feet. There is also included in the records secured from Hermosillo officials the log of a bored hole sent down 460 feet at El Salto. At eighty feet this bore cut a vein six feet thick, at 271 feet it cut a second vein seven feet thick, and at 393 feet it cut a vein twenty-two feet wide, giving a total indication of thirty-five feet of coal.

The test of the coal shows 81.56 free carbon, 85 fixed carbons, 10 volatile matter in some places and from 5 to 7 per cent. elsewhere. The whole field will be subjected to exploration with diamond drills for at least one year. It is hoped that the drills will show up deposits of bituminous and coking coal, which will add considerably to the assets of the property.

Mining Statistics for 1918

Figures compiled by the Mexican Department of Mines for nine months of 1918 show a monthly production of \$20,000,000, Mexican money. Table below gives the quantities in

kilos (equivalent to two and one-fifth pounds avoirdupois), values being in pesos, equal to one-half the amount in American currency:

Metal	Kilos	Value per		Total value
		Kilo	Total value	
Silver	1,601,331	\$ 41.00	\$ 65,854,571.30	
Gold	6,185,207	1,333.33	3,244,881.18	
Lead	79,335,629	0.30	23,800,688.75	
Copper	55,080,286	1.20	66,096,343.89	
Zinc	16,138,131	0.56	9,036,223.51	
Antimony	2,808,121	0.88	2,471,147.48	
Arsenic	901,512	....	.....
Tin	13,537	1.82	24,637.66	
Mercury	120,000	0.59	785,296.99	
Tungsten	109,419	5.00-8.00	787,273.77	
Graphite	4,178,686	0.16	668,589.76	
Manganese	1,889,082	0.23-0.26	458,321.32	
Molybdenite	23,761	....	36,038.27	
Total valuation (pesos)			\$180,064,982.88	

The total number of mining concessions in each State, the additional number granted in 1918, and their area in hectares (two and one-half acres to the hectare) is as follows:

States	Number of Mines in Existence	Additions in one Year	
		Granted in 1918	Area Hects.
Aguascalientes	2,671	11	80
Lower California	827	28	226
Coahuila	814	74	537
Chihuahua	4,858	250	3,549
Durango	3,835	220	1,290
Guanajuato	1,233	155	1,685

States	Number of Mines in Existence	Additions in one Year		
		Number Granted in 1918	Area Hects.	
Guerrero	1,024	34	205	
Hidalgo	1,301	180	2,581	
Jalisco	1,802	80	785	
Mexico	853	4	39	
Michoacán	632	37	713	
Nuevo Leon	1,092	131	983	
Oaxaca	1,610	62	317	
Puebla	259	31	294	
Queretaro	165	34	123	
San Luis Potosí	707	79	707	
Sinaloa	1,600	135	842	
Sonora	5,090	489	4,803	
Tamaulipas	147	11	75	
Nayarit	453	18	112	
Vera Cruz	67	7	48	
Zacatecas	2,146	219	1,349	
 Totals	 33,186	 2,289	 21,343	

The total number of hectares covered by mining claims prior to 1918 was 452,032, or 1,130,075 acres. Adding the 21,343 hectares (53,357 acres) granted in 1918, and a grand total of 1,183,437 acres results.

New Mining Law

A new mining decree effective July 1, 1919, entitled "The Law of Imposts on Mining," was issued on June 27, 1919, by President Carranza, the complete text of which is given below:

I, Venustiano Carranza, Constitutional President of the United Mexican States, do hereby decree that by virtue of the extraordinary power conferred on me in the Department of Exchequer by the law of May 8, 1917, passed by the Congress of the Union, do hereby decree the following:

Law of Imposts on Mining

Chapter One. The Impost in General.

Article 1. The imposts to be levied on mining are as follows:

- A. Property Tax**
- B. Impost on Production of metals**
- C. Taxes on smelting, coinage and assaying.**

Chapter Two. *Impost on mining property.*

Article 2. Titles to mining property will pay, on their issuance, an impost of ten pesos Mexican currency, for each claim set forth in the title, irrespective of the class of minerals to be exploited. This impost will be collected in the form of stamps which will be placed on the titles in question.

Article 3. All mining properties will pay an annual tax in accordance with the following principles:

- (a) From one to five claims at the rate of six pesos annually for each claim, or two pesos for each third.
- (b) From six to fifty claims at the rate of nine pesos annually for each holding, or three pesos for each third.
- (c) For each fifty-one to a hundred claims at the

rate of eighteen pesos annually per holding, or six pesos for each third.

(d) From 101 claims and beyond, at the rate of eighteen pesos annually per holding, and six pesos for each third.

Article 4. The progression of the quotas above indicated will be applicable as long as the holdings shall belong to one owner and the descriptions thereof are set forth by the same mining agency.

Article 5. The payment of the impost on the mining claims will be made in advance by thirds. The failure of payment of one-third will give rise to a declaration of forfeiture of the mining claims which will be made in accordance with the respective regulations.

Article 6. The impost on mining will be made only on the basis of the legality of the title itself, independent of the exploitation of the property or the effectiveness of the proprietor's possession of same.

Chapter Three. *The impost on the Production of Metals.*

Article 7. Gold, silver and metals for industrial purposes whether they be produced in the Republic or whether they come from foreign countries, will pay an impost according to the following quotas:

A. On the value of the gold and silver which may be presented for coinage in the National Mint, 7 per cent.

B. On the value of gold and silver for exportation when presented in form of mineral-stone, dirt, concentrates cyanide, sulphates, smelter-residues, or in any other form whatsoever wherein the metals are com-

bined or mixed with substances which are not metals, properly speaking, 8 per cent.

C. On the value of gold or silver for exportation, which is presented in refined state in the country and not united or mixed with other metals more extensively than is considered necessary for an alloy, 7 per cent.

D. On the value of lead, tungsten, molibdeno, manganese, graphite and mercury, 2 per cent.

E. On the value of zinc, antimony and other metals or minerals which may not be set forth in this article, 1 per cent.

F. On the value of copper for exportation when it is presented in bars, unfused ore or concentrates, when these products exist in a combination exceeding 50 per cent. of copper or exceeding 300 grams of silver, or 5 grams of gold to the ton, in accordance with the following tariff:

When the value of electrolited copper on the New York market is 25 cents American currency, or more, the impost will be sixty per thousand.

From twenty to twenty-five cents United States currency the impost will be 50 per thousand.

From nineteen to twenty cents United States currency the impost will be 40 per thousand.

18 to 19 cts. U. S. Cy., the impost will be 35 per thousand.
17 to 18 cts. U. S. Cy., the impost will be 30 per thousand.
16 to 17 cts. U. S. Cy., the impost will be 25 per thousand.
15 to 16 cts. U. S. Cy., the impost will be 20 per thousand.
13 to 15 cts. U. S. Cy., the impost will be 10 per thousand.
10 to 13 cts. U. S. Cy., the impost will be 5 per thousand.
0 to 10 cts. U. S. Cy., the impost will be 1 per thousand.

G. On the value of copper for exportation, presented in bars, unfused ore or concentrates, and containing 60 per cent. copper, less than 300 grams silver or five grams gold per ton in accordance with the following tariff:

When the value of the pound of electrolited copper on the New York market is 25 cents United States currency or more, the impost will be 60 on the thousand.

- 20 to 25 cts. U. S. Cy., the impost will be 30 per thousand.
- 19 to 20 cts. U. S. Cy., the impost will be 25 per thousand.
- 18 to 19 cts. U. S. Cy., the impost will be 20 per thousand.
- 17 to 18 cts. U. S. Cy., the impost will be 18 per thousand.
- 16 to 17 cts. U. S. Cy., the impost will be 15 per thousand.
- 15 to 16 cts. U. S. Cy., the impost will be 13 per thousand.
- 13 to 15 cts. U. S. Cy., the impost will be 10 per thousand.
- 10 to 13 cts. U. S. Cy., the impost will be 5 per thousand.
- 0 to 10 cts. U. S. Cy., the impost will be 1 per thousand.

H. On the value of copper for exportation when it is presented in the form of unrefined minerals or concentrates whose contents do not exceed 50 per cent. copper, in accordance with the following tariff:

When the value of the electrolited copper on the New York market is 25 cents or more the impost will be 70 on the thousand.

- 20 to 25 cts. U. S. Cy., the impost will be 70 per thousand.
- 19 to 20 cts. U. S. Cy., the impost will be 60 per thousand.
- 18 to 19 cts. U. S. Cy., the impost will be 50 per thousand.
- 17 to 18 cts. U. S. Cy., the impost will be 40 per thousand.
- 16 to 17 cts. U. S. Cy., the impost will be 30 per thousand.
- 15 to 16 cts. U. S. Cy., the impost will be 25 per thousand.
- 13 to 15 cts. U. S. Cy., the impost will be 15 per thousand.
- 10 to 13 cts. U. S. Cy., the impost will be 05 per thousand.
- 0 to 10 cts. U. S. Cy., the impost will be 01 per thousand.

Article 8. The National Mint will receive without limitation, gold which private persons may present for coinage, at the rate of \$1,333.33 pesos the kilogram of pure gold, which price will also obtain for the collection of the impost of production, and for the coinage fees.

Article 9. The power of coining silver money belongs only to the Government of the Union, and will not be exercised by private persons.

Article 10. For the collection of the impost of production on silver and industrial metals the Secretary of Hacienda will issue monthly a tariff which will obtain for the succeeding month, taking as a basis the average of current prices of the preceding two months on the New York market.

Article 11. In all the preceding cases the current prices obtaining on the day of the presentation of the metals in the National Mint, at the Federal Offices of Assay or at the Custom Houses, will be paid for the metals in question.

Article 12. The impost of production will not be levied in the following cases:

A. Old Mexican and foreign gold coin which are presented at the National Mint for recoinage will pay only the corresponding duties of coinage, assaying and smelting.

B. Gold, silver, copper, lead and zinc which may be exported in the form of mineral stone, ore or concentrates whether these be in their natural state, whether concentrated mechanically or whether as sulphates,

cyanides, smelter-residues, always on condition that said metals do not exceed the following proportions:

Gold, 2 grams per ton.
Silver, 200 grams per ton.
Copper, 3 per cent.
Lead, 8 per cent.
Zinc, 5 per cent.

C. Gold, silver, copper, lead and zinc imported into the Republic in the form of mineral stone, ore or concentrates, or partially refined, may be exported in metallic state, after having been treated in the metallurgical establishments in the Republic; but always on condition that the substances imported may have a percentage superior to those specified in the preceding paragraph. Owners of metals will pay in each case the customary fees for assaying and inspection.

D. Metals employed in National industries. In order that gold and silver may be included in this exemption, owners must bring satisfactory evidence before the National Mint or the Federal Officers of Assaying, of the industrial use to which these metals will be put.

E. Mineral samples in natural state, which are exported weighing as much as ten kilograms and with an intrinsic value not exceeding ten pesos.

F. Iron.

Article 13. Fees for smelting, coinage and assaying will be paid in accordance with a tariff issued by the Secretariat of Hacienda on a basis of cost of actual operation.

Article 14. Assay fees are payable when this operation is carried on in accordance with the law, governmental order or petition or at the request of the interested parties; fees for smelting are payable when the lack of homogeneity of the bars or pieces of metal render it necessary to smelt them for assay or coinage; and the fees for coinage are payable when metals are coined.

Article 15. Assay fees are not payable when the operation, carried out in accordance with the law or in compliance with a governmental order, shows the presence only of slight traces of the minerals which are sought.

Chapter Four. *General Dispositions.*

Article 16. The States may not impose upon mining property, or upon exploitation or production of mines, more than a single impost, which is not to exceed 2 per cent. of the value of the metal in the case of gold or silver, nor of 50 per cent. of the impost on the production of other metals or minerals. States are absolutely prohibited from imposing any other tax whatever whether upon extraction, production, refinement, or utilization of the establishments of whatever class, including coke plants, or the capital invested in them, shares and mining titles, transference of ownership of mining titles or of the metallurgical establishments, denunciations, possessions, the organization of mining and metallurgical companies, expedition of titles, actions relative to same, or other requirements prescribed for the establishment, acquisition, or exploitation of mining or metallurgical properties.

Article 17. Refining or metallurgical establishments of all classes whatsoever including coke plants, will pay to the State in which they are situated, or to the territorial government or to the Federal district wherein they may be located, a single impost of five on the thousand yearly computed on the value of the estate and its machinery.

Article 18. The Federal stamp contribution will not be levied upon the entries which the interested parties may make in accordance with the laws and regulations which the State government may prescribe under the conditions which are laid down for them in the preceding articles.

Article 19. The municipalities are rigidly forbidden to impose any restrictions whatever on mining organizations, under any circumstances or pretexts.

Article 20. The exportation of coinable gold is absolutely forbidden under penalty of seizure; this applies to all classes of gold or silver coins of current Mexican coinage, as well as all foreign gold coins. In regard to the exportation of what are known as "Pesos fuertos" the Secretariat of Hacienda may permit same, provided that, within a period of five days there be brought into the country for coinage in the National Mint a quantity of gold metal equal to the value of the pesos.

Article 21. Importations of Mexican and foreign gold coins will be excepted from the payment of consular duties and from the formality of consular invoices.

Article 22. No import duties will be levied on zinc

and aluminum ingots, filings, grains, filiforms, sulphurs, alkaline, cyanides, hipo-sulphates of soda, salt-petre, nitrate of potash or of soda, lead acetate and zinc in small perforated plates, provided the foregoing metals are brought into the country to be utilized in the treatment of minerals.

Transitory

Article 1. The present law will be effective on July 1, 1919.

Article 2. The decree of the 26th of April, 1918, is hereby repealed as well as all the laws and anterior provisions made up to the present relative to imposts and mining privileges.

Article 3. All penalties due from the taxpayers on the annual impost on mining property, including those accumulated to the date of the promulgation of the present decree, are hereby cancelled.

Article 4. All taxpayers owing the impost on mining claims are given the months of July and August without penalty in which to settle the first and second instalments (*tercios*) of the current year.

Article 5. Proprietors of mines with payments due previous to 1919, and who have covered the two thirds of this year in accordance with the preceding article, may settle their over-due obligations in as many payments as they owe instalments, by paying each over-due third at the same time that they pay their ordinary imposts.

Article 6. If the interested parties do not take advantage of this concession or if, having the right to same, by virtue of having complied with the law, they do not make the payments on the dates when they are due, the forfeiture of the titles will be declared as prescribed by law, without further recourse.

Article 7. The parties who take advantage of the concession set forth in Article 5, transitory, are obliged to present to the Secretariat of Hacienda a declaration setting forth the following data: Office where payment is made, number and date of the title, registration number, name of the estate or estates, name of the present proprietor, amount of the debt and voucher covering the two thirds of this year. The period during which the concession set forth in Article 5, transitory, may be utilized, will expire the 30th of September of the current year.

Article 8. The imposts of mining property or on the production of metals, which may be owing when this law goes into effect, will be liquidated and paid in accordance with the quotas of the decree of April 26, 1918, which is nullified by the present decree.

Article 9. While the present international restrictions exist, which affect the free commerce of gold, the exporters of mixed bars of whatever composition, of gold, minerals and all classes of concentrates, when these have a percentage of gold exceeding two grams per ton, must re-import into the country in bars of coinable gold or in Mexican or foreign gold coin a quantity equivalent to the gold contained in the bars, minerals or concentrates which are exported.

Article 10. The Secretary of Hacienda will determine the procedure which must be followed to guarantee the re-importation of the gold referred to in the foregoing article.

Article 11. The production impost will not be levied on gold which is re-imported in accordance with the foregoing articles, since it will have already paid this impost on exportation.

Ordered to be printed, published, circulated and complied with:

Given at the President's Palace, in Mexico City,
on June 27, 1919.

New Mining Company

It was announced on August 23, 1919, that a new mining company, the Mexican Corporation, had been formed, with a capital of \$5,000,000, under the auspices of the Camp Bird and Santa Gertrudis companies. Several South African financial houses are participating in the new venture, including the Consolidated Gold Fields (represented by Lord Brabourne), Consolidated Mines Selection Co., the Exploration Co., and the Imperial and Foreign Corporation.

CHAPTER V

AGRICULTURE

Orange crop. Banana flour. Opportunities. Vegetable oils. Cereals. Cotton. Guayule rubber. Rubber factories. Cattle industry. Sisal. Vine culture. New developments. Irrigation.

MEXICO is more richly endowed with agricultural resources than any other country in the world, and in spite of the unsettled conditions still prevailing in certain parts of the country, the exports for the year 1918 of agricultural products and livestock amounted to \$74,253,500. With tropical, semi-tropical and temperate zones, with millions of acres of rich virgin soil, and with other fertile millions of acres that have been merely skimmed, Mexico offers opportunities for agricultural developments such as can be found in few parts of the world.

Ninety per cent. of all the fruits existing in the world are grown in Mexico. The orange crop of the State of Sonora for the season just closed was a large one, and 100 carloads were exported. A large fruit house in St. Louis is arranging for the regular shipment from Mex-

ico of large quantities of Sonora oranges, which are equal in every way to the choicest fruit grown in Louisiana or Florida. The principal producing States of oranges and citrus fruits are Sonora, Jalisco, San Luis Potosi, Vera Cruz and Morelos. The principal orange State is, however, Sonora, where the orange matures two months earlier than in California. With proper development under American management the Mexican orange industry would soon assume great proportions.

These oranges, which are seedless, formerly had a large sale in California, until the disease known as Tripetta Luddens devastated the greater part of the groves, and the oranges were barred from the United States. Having conquered this disease, exportation is about to be renewed. In the years 1900 to 1904 the Haciendas of Santa Ana, the districts of Ocotlan, Atotonilco, Yurecuaro and La Barca, in the State of Jalisco, exported 800 box cars annually of oranges to El Paso, San Antonio, Kansas City, St. Louis, Chicago and New York. In the States of Vera Cruz and Tamaulipas, in groves near the coast, fruit is obtained two years after planting.

Banana Flour Factories

The exportation of bananas, which are extensively cultivated in the southern Mexican States, has grown in recent years from three to five million dollars. Preparations are at present being made to engage in the manufacture of flour from bananas upon a large scale in the States of Vera Cruz, Tabasco, Chiapas, and part of Oaxaca. It is proposed to utilize the surplus crops which cannot be shipped owing to their too rapid ripening, and which in the past have been a total loss to the growers. Four factories have already been established in Villahermosa, capital of the State of Tabasco, for the manufacture of this banana flour, and for the extraction and utilization of the rubber contained in the skins of the fruit. It is expected that this product will to a large extent take the place of wheat flour among the poorer classes, while it will be obtainable at much lower prices.

Methods of evaporating bananas for export are also being considered. At present few planters have the ovens necessary for preparing evaporated bananas, but a great industry in this line is awaiting development by enterprising American capitalists. The fruit when ripe could be pulped by adequate machinery capable

of large production, and after rolling or cutting the pulp in rectangles of the desired size and thickness, the evaporation could be completed in special ovens. Thus might be obtained many tons of evaporated banana, perfectly preserved in tin cans, both light and impermeable for transportation to any part of the world.

The cleaning and cutting of the banana, reducing it to pulp and then cutting, evaporating and packing it, might be done in lighters of various draughts which would navigate the extensive rivers of Tabasco and connect with the planters at the moment when the fruit becomes ripe. By such methods might be avoided a waste of the ripe fruit, which is so difficult and costly to transport. Tabasco has unlimited potential production of this nutritious food product.

Strawberries of the finest flavour are grown all the year round in the neighbourhood of Irapuato, State of Guanajuato, and at points in the Valley of Mexico. The raspberry is cultivated at San Angel, near the capital. Pineapples are cultivated to a great extent in all the southern Mexican States, but very few are exported.

Opportunities for Americans

There are opportunities of incalculable value to enterprising American fruit growers who will go down to Mexico and cultivate in marketable quantities the guava, mamey, the luscious custard apple, and the alligator pear. And the same thing applies to vegetables, for Mexico can produce green peas, asparagus and celery equal to the finest products of the United States. At present Mexico imports considerable quantities of canned fruits and vegetables.

The territory around Tampico is peculiarly adapted to the cultivation of the green lime. Locally there is little cultivation of the groves, but the trees grow in great profusion throughout the sections adjacent to Tampico. Several years ago limes were exported, but never in any great quantity, and it has been some time since any such shipment was made. The apparent drawback to the business is the lack of sufficient means to gather the fruit, but with an organization properly supervised there is no present reason why this obstacle could not be overcome. The harvesting and packing season is November and December. As a likely development arising from the marketing of the limes is the extraction of the oil from the fruit. This need

not be confined to the lime itself, but would include oranges and lemons, which are overabundant in the Tampico district. Manufacturers of machinery for the extraction of such oils, and importers interested in the green lime, should communicate with the American Chamber of Commerce, Apartado No. 777, Tampico, Mexico.

Vegetable Oils

Mexico produces several plants yielding oils, both industrial and succulent, but no great industry has as yet developed from them. The piñon (*jatropha curcas*) yielding 16 per cent. of a strong cathartic oil; the *riccinus communis* (castor oil bean) yielding 40 per cent. of that oil; ajonjoli (*sesame indicum*), yielding 33 per cent. of a soft sweet oil, the peanut, and several others may be mentioned.

A new fruit containing a large percentage of oil has been discovered in the region of Torreon, and is known by the name of "chichopoxtle." Experiments show that 25 per cent. of its contents consists of oil of great value in industrial pursuits requiring a lubricant of high quality. It is proposed to introduce the cultivation of this fruit upon a large scale. In Yucatan a plant has been found which is claimed to be a

specific in cases of erysipelas. The growth in question is a climbing vine, yielding milk when tapped. This is applied either in the form of ointment or with other substances, and is said to give relief in twenty-four hours, followed by a complete recovery in three days.

Cereals

Several millions of the inhabitants of Mexico live on corn, the annual production of which in normal times is about 110,000,000 bushels, which is less than the quantity needed for domestic consumption, so that there is often a large importation. In some sections two crops a year are planted. The scarcity of corn in Mexico is one of the chief causes of all the revolutions, and explains the constant efforts of the Mexican Government to increase the production by the introduction of modern methods and American machinery. In May, 1919, General Pablo Gonzales, the military commander of the State of Morelos, called upon the government to provide twenty tractors and five hundred ploughs for the use of the farmers in that region. The machinery was distributed throughout the State. General Gonzales stated that this was all that was needed to restore that sec-

tion (recently freed from banditry by the killing of Zapata) to a normal condition of productiveness.

Normally the summer crop of corn in the States of Vera Cruz, Tamaulipas and Chiapas is estimated at about 300,000,000 pounds. In 1918 military agricultural colonies were established in the States of Chihuahua, Mexico and elsewhere in sections where active operations of the troops were no longer required, but where it was deemed necessary to maintain an armed force in readiness for service.

There was plenty of rainfall throughout the State of Coahuila in 1918, and the ground was in fine condition for the planting of the corn crops. Every foot of available land, even reaching up into the mountains, was put under cultivation, and an immense harvest of wheat and corn was expected. During 1918 there was an increased demand for machinery and agricultural implements throughout northern Mexico. Eight hundred and thirty-five thousand bushels of corn alone were raised in Chihuahua in 1918.

In the central plateau in the north of Mexico agriculture is found in its most complete development, helped by extensive irrigation projects. The principal products of this region are

corn, wheat, beans, peppers, peanuts and tobacco.

The Mexican plan of cultivation makes it possible to take off the land three crops a year, one crop of wheat and two of corn. The average yield of wheat per acre is about 20 bushels, and of corn about 50 bushels on irrigated soil and about 30 bushels on dry land. The area best adapted to wheat cultivation is on the great plateau at an elevation of 6,000 to 9,000 feet, and comprises some 52,000 square miles, over one-third of which could be planted to wheat without serious detriment to the other agricultural interests, yielding over 110,000,000 bushels.

Barley is grown to greatest advantage in Hidalgo, Tlaxcala, Puebla and Mexico, the yield being about 7,000,000 bushels. Rice is grown in Colima and Guerrero, production about 1,250,000 bushels. The frijol or Mexican bean is grown in every State in Mexico, the leading producing States being Jalisco and Vera Cruz, the crop having an annual value of about \$7,500,000, practically all consumed in Mexico.

The west coast States of Sonora and Sinaloa are the great producers of garbanzo (chick peas), which appear regularly at all Spanish meals, and are grown in nearly all the States.

The exports by rail of the Mexican garbanzo crop raised in 1918 from the State of Sonora amounted to 174,865 sacks, and from Sinaloa 134,799 sacks, making a grand total of 309,644 sacks. This was the largest crop raised since 1912. There were also large shipments by water. The total crop was over 25,000 tons, and produced an income of more than \$4,500,000, the crop being disposed of through a single house in New York at \$180 per ton. This is one of the most profitable branches of agriculture in Mexico.

Cotton

The great cotton belt of Mexico is the Laguna district, which includes portions of the States of Chihuahua, Coahuila, Nuevo Leon, Tamaulipas, Durango, Zacatecas and San Luis Potosi. This district produces 90 per cent. of the cotton grown in the republic. The cotton is put up in square bales of about 500 pounds, buckles being used in baling. The cotton crop for 1918 was one of the largest in the history of Mexico, reaching 78,392,700 kilos. It is said that 50,000 bales will be exported to the United States, Japan, and South America. The Association of Cotton Producers of Torreon, Mexico, recently sold 10,000 to 15,000 bales of cotton to Yus Hu

Kita, of Tokyo, and 15,000 bales to firms in England. The area planted for the 1919 season will be much reduced, however, owing to the ravages of the boll weevil.

Guayule Rubber

The extraction of rubber from the shrub known as guayule is one of the modern and most successful industries of Mexico. The exports from the Piedras Negras district alone for the year 1918 amounted to 2,656,769 pounds, of a value of \$1,004,561. The guayule shrub grows in the mountains of Zacatecas, Nuevo Leon, San Luis Potosi, Coahuila, Durango, Chihuahua and Sonora, at an altitude of 3,000 to 6,000 feet, blossoms in September or October, propagates itself slowly, and dies after fifteen years of growth.

The yield of marketable rubber from the wild plants runs from 6 to 15 per cent. It differs from the best quality Para in some respects, but for many purposes for which rubber plays an important part in modern industry it has received worldwide recognition. There are four distinct advantages in guayule. It grows in otherwise sterile soil, if this contains a due amount of lime; it requires only a subtropical climate, healthy at all times, it can be gathered

all the year round, and commercially it is profitable, even considering the low per cent. of rubber content.

Beginning in 1902, when American capitalists financed a series of experiments, the industry has grown until now there are factories in the States of Durango, Coahuila and San Luis Potosi. By 1911 the exports of guayule rubber amounted to 19,749,522 pounds, which fell off to 2,816,068 pounds in 1916 owing to the revolution. The 1918 production of guayule was the largest in several years, although the complete figures are not yet available.

Analysis of a good sample of the ordinary grade of guayule rubber gave: Rubber, 57.28 per cent.; resin 19.35 per cent.; water 20.69 per cent.; inorganic impurities 2.68 per cent. Better grades give a much higher rubber content. The crop is usually cut every two or three years.

Under the name of the Fomento de Comercio Internacional, S.S. (International Commerce Exchange), a new rubber factory which is still in process of construction has commenced the manufacture of automobile tires and inner tubes in Mexico City. It is a private enterprise representing an investment of about \$350,000. The factory, a modern brick and cement structure, has its own electric lighting plant, and

uses oil for fuel. It is equipped with American machinery, and is under the supervision of experienced American foremen. About 100 hands are employed at present, but when running at full capacity the factory will employ about 350 men. It also has equipment for the manufacture of raincoats, hot-water bags, and rubber soles and heels, and it is the hope of the owners to manufacture eventually rubber goods of every description. There is another small rubber factory in Mexico City which is prepared to manufacture rubber tires.

Cattle Industry

The raising of cattle has always been one of the most important industries of Mexico, where there were formerly vast haciendas containing 350,000 head of cattle, the importation and crossing of fine stock having produced magnificent results. The best so-called native cattle of the country are generally a cross between the bullfighting breeds imported from Spain and the Brown Swiss dairy animals, the result being a first-class beef type. In round numbers there were in Mexico before the revolution about 5,000,000 cattle, about 800,000 horses, 300,000 mules, 250,000 asses, 5,000,000 sheep, 4,000,000

goats and 600,000 hogs. Hog raising is general throughout the country.

The Sisal Industry

Another of the leading industries of Mexico is the production of sisal, or henequen fibre, which enters largely into the manufacture of cordage and some forms of fabrics. The principal demand for the raw material is for use in the manufacture of twine for harvesting. Owing to certain peculiarities of the soil and climate of Yucatán, that State has become the centre for sisal cultivation, and everything in Yucatan centres around that industry, the annual production bringing in a constant revenue of many millions.

The plant from which the fibre is extracted is one of the Agave family, and closely resembles the maguey, well known as the source of the famous alcoholic beverage "pulque," but which is also valuable for its fibre as well as for the manufacture of sugar, an enterprise which the government is encouraging, while at the same time discouraging the production of the deleterious liquor.

The plant is propagated from the small "suckers" growing at the roots of the parent

stalk, and it requires several years of cultivation before the leaves are of sufficient size to utilize in fibre making. These leaves are from three to five feet in length, and continuous crops are gathered from the same plant for an extended term of years. After being cut from the parent stem with a "machete," or large knife, the leaves are taken to the machinery shed, where they are put through a special machine designed for rapid decortication. The resultant fibre is carried into the open air and suspended from wires or otherwise disposed until it is thoroughly dried by the heat of the sun. It is then packed in bales and shipped to various portions of the world where there is a demand for it.

In connection with the separation of the fibre from the bulk of the stalk, it is a fact that cattle and other domestic animals eat the refuse pulp with avidity, and become fat and robust without eating any other food. Indeed, when this pulp is available, they will touch nothing else, but remain close to the factories until they are sated.

The total exportation of henequen from Yucatan for the year 1918 is estimated at 600,000 bales and is valued at 48,000,000 pesos (1 peso = \$0.50 United States currency). For the

current year, it is expected that the output will be even greater, owing to the fact that new markets have been opened in various parts of the world, notably the Argentine Republic, where the fibre is used in the manufacture of grain bags. The henequen planters recently sent a trade commissioner to Argentina for the purpose of studying the market there as well as to investigate generally the possibilities of trade between the southern Republic and Mexico.

New Developments

Vine culture is now being established on an extensive scale in the State of Hidalgo, quantities of cuttings being brought from other sections. Some of the land best adapted to viticulture is in the vicinity of Parras, State of Coahuila, where the industry has been well established. Grapes as an article of table food are grown in practically every Mexican State, the yearly production being about 6,600,000 pounds. Coahuila, Chihuahua and Durango grow the largest grapes.

The Governor of the State of Puebla has requested the assistance of the Mexican Department of Agriculture in the establishment of a national vineyard in that region. In accord-

ance with this request, the government of the United States has been asked to give permission for the exportation of one million grapevine cuttings from California, the varieties cultivated in that State being adapted to the soil and climate of various portions of Mexico. A similar movement is under way in the State of Queretaro.

The agent of agricultural information and propaganda in Tacambaro, State of Michoacan, has advised the Mexican director general of agriculture that there has recently been discovered in that section a plant known as "irguan," which produces red ink that is adaptable to various uses. The plant is said to be found in great abundance, and the agent mentioned requested that some one be designated to make a careful study of it for the purpose of ascertaining whether it might be utilized in any of the industries, and also to determine whether it might be transplanted to other climates.

An association of Vera Cruz business men has been formed for the purpose of establishing a bank to encourage the formation of agricultural colonies. Under instructions of the Department of Agriculture special agents have been appointed in various portions of the Republic for the purpose of stimulating the culti-

vation of idle lands and of introducing modern methods of agriculture. It is intended to extend this work to all portions of the country as rapidly as possible.

Specimens of bread made from flour produced from the nopal cactus have been submitted to the National Board of Health of Mexico for test in order to determine its suitability as food for human beings. The novel product is said to be appetizing in appearance and taste, and as there is an unlimited supply of the fruit available the originators of the new article of food are hopeful of its introduction upon a large scale.

A systematic effort is being made to introduce the silk industry into Mexico, a country which is well adapted for it in every respect. A shipment of silkworm eggs has recently been received from France, and the Director General of Agriculture has issued a call to all persons interested in this industry to join classes to be established for the purpose of giving expert instruction.

Irrigation Projects

The Mexican Secretary of Commerce and Industry is studying a project for the irrigation



THIS PRIMITIVE METHOD OF FARMING IN MEXICO IS SLOWLY GIVING WAY TO THE INVASION OF AMERICAN PLOWS AND TRACTORS



A MEXICAN CONTRAST—OX CART BRINGS FREIGHT FOR THE RAILROAD

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of the fertile lands of the Valley of Mexico upon a large scale. At present most of these lands only produce a single crop annually, depending entirely upon the rainfall for moisture. Where water is available for irrigation, as among the so-called floating islands at Xochimilco, continuous crops are produced, and it is the design of the department named to construct irrigation works upon a large scale in order that the best possible use may be made of the lands not now so provided. It is believed that in this manner all the food required by the City of Mexico can be produced at its very doors, and even a surplus for shipment elsewhere.

It is known that large tracts of lands in the States bordering the United States, notwithstanding the fact that they are on the southern bank of the Rio Bravo, are completely deserted for lack of cultivation; but they really offer a bright prospect to agriculture, with only one requirement, and that is, a good system of canals, which they now lack.

Among the great works that could be cited in this region is the great dam for the storage of the waters of the Rio Bravo, called "Elephant Butte." It has been some time since Mexico entered into an agreement with the

United States in regard to the exploitation of the waters of the Rio Bravo, by virtue of which Mexico has the use of seventy-six million cubic metres of water.

The northern part of the Territory of Lower California consists of lands of marvellous fertility, improved by the circumstance of being near the banks of the Colorado River, which is the boundary between that Territory and the State of Sonora, and receives at its mouth the waters of the tributary called Rio Nuevo (New River), both of which enclose a zone that could very well be employed for the purpose of building canals. Much has been said recently about the extensive projects in contemplation for the construction of an extensive irrigating system by using the Lake of Chapala, as well as the waters of the Rio de Santiago or Tololotlan, which has its source in that lake.

With the renewed interest in farming in Mexico, the old-time implements of agriculture are being discarded for modern machinery. Many large landowners have recently resided for considerable periods in the United States, for political reasons, and on their return have introduced the American machinery which they had observed used to such good advantage here. It has also been discovered that it is less expensive

to maintain a tractor than horses and mules, which are so apt to be stolen by roving bandits in search of mounts. Fortunately, it is impossible to use tractors in guerrilla warfare.

A company of American capitalists has asked for a concession to exploit the island of Guadalupe, off the coast of Lower California. The island is uninhabited, but it has herds of wild goats and cattle and large deposits of guano. There is much fertile agricultural land on the island, and it is proposed to colonize it with families.

CHAPTER VI

TIMBER

Vast tracts of pine. Mahogany. Valuable hard woods unknown to American markets. Woods for shipbuilding. Decay resisting species. Dyewoods. National Forestry School.

THE great wealth contained in the Mexican forests is not yet appreciated by the lumber world. The railroads are now, however, beginning to open up the country in some of the Mexican timber regions, and already narrow gauge and logging railways are either in process of construction or being projected. Lumber companies are erecting new and enlarged mills, and the lumber industry of the country, as yet in its infancy, is certain to have a tremendous growth in the very near future. The monthly output of the mills in the State of Durango in 1918 was estimated at 2,250,000 feet of sawn lumber. In addition, about 600 carloads of ties and bridge timbers are turned out by these mills monthly. The daily capacity of the lumber mill at Madera, Chihuahua, is 500,000 feet, and that of the Pearson mill, Chihuahua, 100,000 feet daily. The

lumber shipments in 1917 from these two mills amounted to 19,500,000 feet, and the figures for 1918 will be much larger.

There are immense quantities of building timber and cabinet woods in Mexico, many species of which are as yet unknown in foreign markets, although they are classed among the most valuable and expensive. The yearly production of mahogany amounts on an average to about \$1,200,000 Mexican money (\$600,000), the States of Chiapas, Tabasco, Vera Cruz and Campeche supplying the greater quantity. In normal times about one-half of the mahogany consumed in the United States comes from Mexico. Cedar is found in all parts of the country, but the States of Chihuahua, Tabasco, and Vera Cruz contain the largest and most desirable forests of this wood, cutting annually cedar logs to the value of more than \$1,000,000. Ebony is produced in Tamaulipas, Guerrero, Hidalgo, and Yucatan. Puebla produces the largest quantity of aloe wood, Coahuila the most oak, Nuevo Leon the most walnut, Lower California leads in iron-wood, while the State of Jalisco is celebrated for its orange wood.

Vast Tracts Awaiting Exploitation

It is conservatively estimated that the area of first-class timber in Mexico comprises from 20,000,000 to 25,000,000 acres. In one section of the State of Durango recent investigation showed some 5,368,500,000 feet of commercial pine, and another tract in the northern part of the same State containing 4,800,000 acres was estimated to have 10,000,000,000 feet of commercial pine ready for cutting. It is possible to buy much of the Durango timber land at a very low price, and returns from the same can be estimated on the value of the lumber, the value of the firewood or charcoal, and the value of the land after the timber is cut, this latter being a variable quantity.

Charcoal produced from these timber lands is a feature the American lumberman ordinarily thinks little about, yet it is a source of revenue, as the demand throughout Mexico for charcoal is almost unlimited. Besides the States mentioned, pine is also found in Chihuahua, Jalisco, Michoacan, and Guerrero, the standing forests in these States comparing favourably with similar timber in the United States and Canada as regards quality, diameter, and extreme length of clear body.

Valuable Hardwoods

There are twenty-five varieties of hard woods not generally known to the American lumberman. Among the chief of these should be mentioned the zapote mamey, which resembles the walnut in appearance, is of a dark brown cinnamon colour, has about the same grain as mahogany, and is capable of a very high polish. The zapote chico, of the same family, is practically one of the most valuable woods growing in the tropics. The trees are of great size, the length of their clear body being often 50 feet, and in tropical Mexico they are very plentiful. The sap, which is the chicle of commerce, is gathered in very much the same manner as the rubber sap. The wood is of a clear, deep, reddish brown colour, very hard, but easily worked until thoroughly seasoned, when only the finest edged tools have any effect on its surface. The wood takes a beautiful finish, and is valuable for furniture. Used as piling for both railway and port construction, it has been found that the chico zapote bears the test of a much longer period of endurance than oak; sea worms will not attack it, and for withstanding the effects of either salt or fresh water, mud, wet or arid soil, it appears comparatively indestructible.

Zapotillo colorado is another tree of the same family as the zapotes. It is often three feet in diameter, and usually yields fifty feet of trunk without knots. The grain is very close, light in colour, and takes a fine polish. Zapotillo blanco is a beautiful white wood with a yellowish tinge of even colour, and is very desirable for inside house finishing.

The palo maria, with a trunk from 50 to 100 feet long and clear of knots, closely resembles mahogany in colour, grain and weight. The Mexican red cedar is of an even grain and colour, and is extensively used for lead pencils and cigar boxes. One of the most promising of the undeveloped woods is the granadilla, a kind of rosewood, in appearance equal to mahogany, of a rich, reddish brown colour and with dark wave line markings.

Another beautiful and curiously marked wood is the galeado. The colour is yellow, with distinct irregular markings of seal brown, close grain, and very heavy. The maccaya wood, much like hickory, is used by the Indians for wagon work. Other less known woods are the coralillo, the guapage, huisch, jicoco, cork wood —of which there is a large amount in tropical Mexico,—and the lignum vitae.

The extensive forests of the hot country in

the States along the coast contain not only mahogany and a great variety of other cabinet woods, but also woods yielding precious gums, wood for dyeing purposes, and other industrial uses. What is urgently needed is a scientific investigation of the forestry resources of Mexico. The methods of felling and hauling timber in the forests of the hot country are wasteful and destructive.

Twelve Important Varieties

Following is a list of twelve woods which are available in sufficiently large quantities for commercial purposes, though the question of getting them to the market is a serious one:

Palo Prieto. Found over all the southwestern part of Mexico, is quite common in Sinaloa, but does not here reach the enormous size of the trees in the extreme southern part of the Republic. Both sap and heart wood are highly resistant to rot, and it is considered one of the best woods of Mexico.

Ebano (ebony). Found all along the coast of Mexico, grows to a large size in Sinaloa, but the logs are not very straight. Logs of more than twelve inches in diameter with perfectly sound hearts are very rare. The excellent qual-

ties of this wood when cut from live, sound trees are known all over the world.

Amapa Negra, or *Amapa Verde*. Found all over Mexico. In the State of Sinaloa the trees are rather small in size, although plentiful. It is a very much better wood than the Amapa Blanca, and is employed rather extensively in shipbuilding.

Tepemeequite, or *Meuto*. Found all over the southwestern part of Mexico and is especially plentiful in the States of Sinaloa and Nayarit (Tepic). Used extensively in shipbuilding, especially where heavy compressive stresses are encountered. Its worst characteristic is a tendency to check badly when exposed to the sun, the ends frequently opening up for a distance of two or three feet and curling back on the log.

Truchas or *Trucha*. Found all over the Pacific coast of Mexico. Grows well in Sinaloa, especially in the southern part. This wood is used in shipbuilding wherever heavy tensile stresses are encountered.

Woods Favoured for Shipbuilding

Palo Amargo or *Cedro Blanco* (Mexican white cedar). Found all over the northwestern part



MAHOGANY LOGS FOR EXPORT FROM THE STATE OF CAMPECHE



CACAO OR CHOCOLATE PODS READY FOR SHELLING

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of Mexico. Grows to a fair size only and is not very straight. The Mexicans consider this wood to be superior to the best Douglas fir or yellow pine. It is used very successfully in naval construction where a light wood of the approximate strength and resisting qualities of Douglas fir is required.

Palo Margarita or *Barilillo*. Very often confused with the Palo Fierro (ironwood). Found all over the southwestern part of Mexico and quite common in Sinaloa. Considered one of the very hardest of the hardwoods and used very extensively in shipbuilding, especially where heavy compressive stresses occur.

Haba. Very plentiful in the coast country of Sinaloa and Nayarit. Grows to a large size, fairly straight, and is seldom hollow. Considered by Mexican shipbuilders to be the best native wood for naval construction. It is rather difficult to handle when green, as the sap burns the skin upon contact and is very plentiful just under the bark of the tree.

Guayacan (*lignum-vitae*). Very plentiful on the west coast of Mexico from the State of Sonora to Oaxaca. Grows to greater size and degree of hardness in southern Sinaloa and Nayarit. Regarded as one of the most reliable woods growing in Mexico and undoubtedly the

best for certain parts of ships. When placed in very dry places, however, it is liable to become brittle and break under heavy shearing stresses.

Amapa Blanca. Found all over the Republic of Mexico; in the State of Sinaloa grows to a fairly large size and is quite straight. While the *Amapa Blanca* is not so durable and is more liable to decay than others of the Mexican hard-woods, it is considered well adapted to take its place among the most reliable materials in ship-building.

Two Decay-Resisting Species

Mora Amarillo (logwood). Found all over the west coast of Mexico in great quantities, the most durable kinds being from the States of Sinaloa and Nayarit. Considered and proved to be one of the native woods most highly resistant to the effects of salt water, damp atmosphere, and rot induced by vegetable fungi. Its qualities as a dyewood are too well known to require comment.

Arellano or Palo Colorado (rosewood). One of the softest of the Mexican hard woods. Undoubtedly has the greatest resistance to decomposition induced by vegetable fungi of any of the native woods. It is found in Sinaloa, Naya-

rit, Colima, Jalisco, and Guerrero, and it is considered by the natives to be well adapted to constructions of all kinds where strength, durability, and reliability are essential.

Mexican Dyewoods

In 1917 there were imported into the United States from Mexico 22,250 tons of logwood, 2,112 tons of other dyewoods, and 2,683 pounds of indigo. Dyewoods and plants found in Mexico include Santa Marta wood or peach wood from the Sierra Nevada; safflower; fustic and logwood, the latter indigenous to Campeche Bay, Mexico.

Educational Work

A horticultural experimental station has recently been established at Queretaro. A thousand trees of various kinds have been planted, including those of both the temperate and subtropical regions, and these will be distributed among growers as soon as they are ready for transplanting. On March 1, 1919, the National Forestry School was formally opened at Coyoacan, a suburb of Mexico City. The course of instruction will cover a period of three years.

CHAPTER VII

TRADE OPPORTUNITIES

Agricultural implements and machinery. Henry Ford in Mexico. American trade associations open branches in Mexico. List of articles urgently needed. Salesman's itinerary. New enterprises. Newspapers and magazines. Manufacturing in Mexico—shoe factories, breweries, textile mills, tobacco factories. Japanese competition. German competition. American automobiles in Mexico. Laundry and cleaning machinery needed. Opportunity for American dyes. Sport in Mexico. Grand opera in the bull ring. Trade bodies in Mexico. Present an opportune time to develop trade. Patents and Trade-marks.

THERE is a growing market for American agricultural implements and machinery in Mexico. There are no Mexican import duties on farm machinery, and near Mazatlan a Mexican citizen has established an experimental farm where he hopes to persuade American firms to demonstrate their goods for the benefit of the farmers of the surrounding country.

Contracts have been entered into by the Mexican Department of Agriculture for the purchase from American manufacturers of 200

tractors, one thousand gang-ploughs, and one thousand threshing machines. A large number of trucks suitable for agricultural purposes will also be secured. Demonstrations of the practical use of this machinery will be made in various parts of Mexico, and then the implements will be sold to farmers desiring them at actual cost and on instalments. Much farm machinery has already been brought into Mexico and sold in this way. The extensive areas of level valley lands in many of the Mexican States offer splendid opportunities for the use of modern machines.

Henry Ford has submitted a plan to President Carranza for the establishment in Mexico of an extensive and complete plant for the manufacture of tractors for agricultural purposes. The plan is to educate Mexican mechanics in the Ford plants in the United States and then send them to Mexico to operate the factory there. These Ford tractors will be sold to farmers practically at cost and on easy terms.

A corps of expert engineers who have been entrusted with the preliminary investigation needed for carrying out Mr. Ford's plans was in Mexico at the time of my visit there. Included in the party were several engineers who had been employed in Mexico and understood

local conditions. At the present time it is understood that Mr. Ford will confine his operations to the establishment of three plants at different points. It is believed that the cities of Monterey and Durango will be the two first selected, and that the third will be at some point in either Michoacan or Jalisco. In the first named city all the essentials are to be found in the way of railway communication, coal, oil, labour, etc. After making a thorough study of the various points suggested, the visiting engineers will return to Detroit and report to Mr. Ford before any further steps are taken. Distributors have already been appointed in Mexico for the Ford tractors.

A travelling exhibition of agricultural machinery will also be established by the Mexican Government, the necessary rolling stock being provided by the government railways. The increase in the tomato crop this year has been sufficient to cause the growers to purchase a notable amount of American farming machinery and implements, and the coming year will probably mean a greater increase. The crop this year amounted to one thousand carloads, or more than three times that of any previous year.

*American Trade Bodies Open Mexican
Branches*

The Chicago Association of Commerce has opened a branch office in Mexico City in charge of H. H. Garver. The plan of the Mexican bureau of the Association is to provide for the needs of the present situation in Mexico. Offices will be opened in other Mexican cities as developments warrant. Enquiries for American goods will be telegraphed or cabled by representatives in the field. These will be communicated to firms listed with the bureau which sell the articles required. Bids will be forwarded through the Chicago headquarters, and when business is closed the field representative will act as the agent of the concern making the sale. He will be compensated on a commission basis, the rate to be agreed upon at the time the bid is forwarded.

This Mexican trade bureau of the Chicago Association of Commerce is to be operated as nearly as possible on a self-supporting basis, each interested firm paying a registration fee of \$5. Necessary expenses and telegraph and cable tolls will be prorated among those directly involved. The benefits of this bureau will be extended to manufacturers and merchants

throughout the Mississippi Valley as well as in Chicago. The bureau is the direct result of the recent visit to Mexico of the delegation of the Mississippi Valley Association.

The American Chamber of Commerce of Mexico has established a branch office in New York with James Carson of the National Paper & Type Company as Chairman, the Vice-Chairman being J. A. Lewis, Vice-President of the Irving National Bank, and C. R. Austin of the General Equipment Company, the Secretary of the branch being Manuel Gonzalez, Chief of the Latin-American Trade Division of the National Association of Manufacturers.

Articles Urgently Needed

Articles in great demand at the present time in Mexico include the following: Earthenware, cutlery, glass containers with metal tight caps for preserves, brass beds, brass varnish with bright and dull finish, bicycles, fancy goods, glassware, textiles such as denim, gingham, zephyrs, ticking, cashmere, indigo, Palm Beach, sweaters, cotton, wool, silk, art silk, cotton drills, cotton yarn, shirtwaists, hosiery, men's shirts, neckwear; shoe store supplies; electric lamps; colouring materials; leather; mining

equipment; paints and colours, chemicals, pharmaceutical specialties, soap, condensed milk, lard, patent and proprietary medicines, printing inks, perfumery, printing presses, and paper.

There is a large market in the Salina Cruz district for a windmill with a low tower, not more than 14 or 16 feet high, but with twice the ordinary width at the ground and powerfully braced. The standard windmill has never been a success in this region, swept as it is byraging "northerns" which blow on an average of four days in ten in the dry season.

In Mexico City there is a market for certain classes of glazed tiling for walls and floors. The most popular style is an English product 6 x 6 inches, but this is now unobtainable, leaving the market open for the American make 3 x 3 inches, in various colours. This must be a high grade tile, suitable for walls and floors of bathrooms and kitchens. Another tile that would find a ready market is a flat—preferably red—slightly glazed tile to be used in building charcoal stoves. The tile should be about 6 x 6 inches and 1½ to 2 inches thick.

Over \$300,000 worth of lumber was imported from the United States into Monterey, Mexico, during April, 1919. Tampico, Vera Cruz and

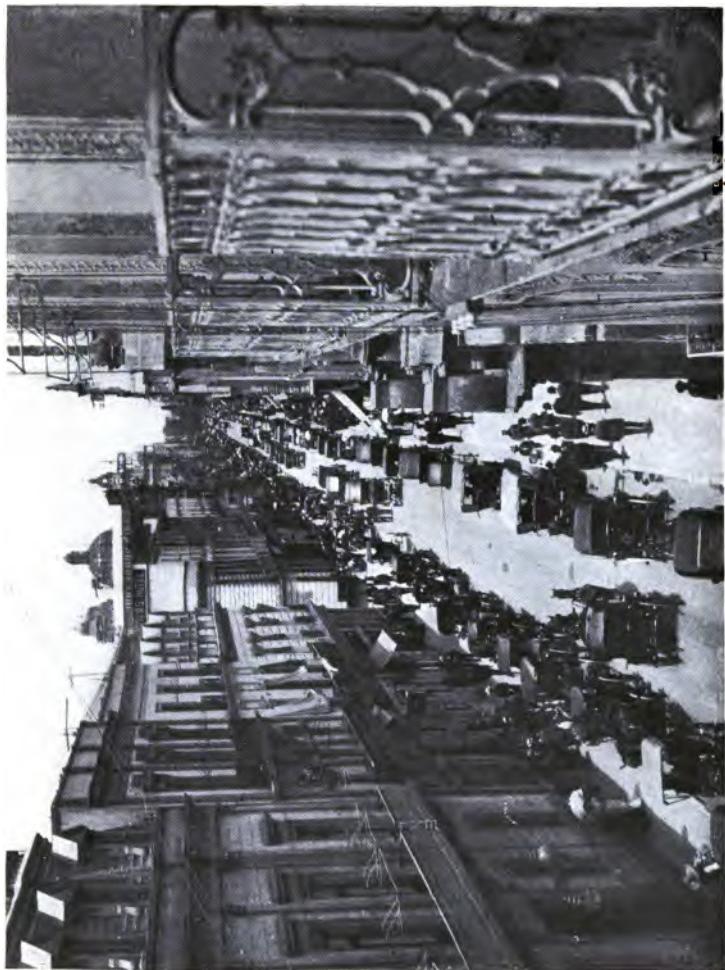
the Pacific ports also received American lumber in considerable quantities. An unusual activity in manufacturing Mexican lumber is reported. Mills in the forest districts of Michoacan, Jalisco, Durango and some of the other States have resumed operations, but it will be some time before the yards in the principal cities and distributing centres of Mexico are restocked with building materials.

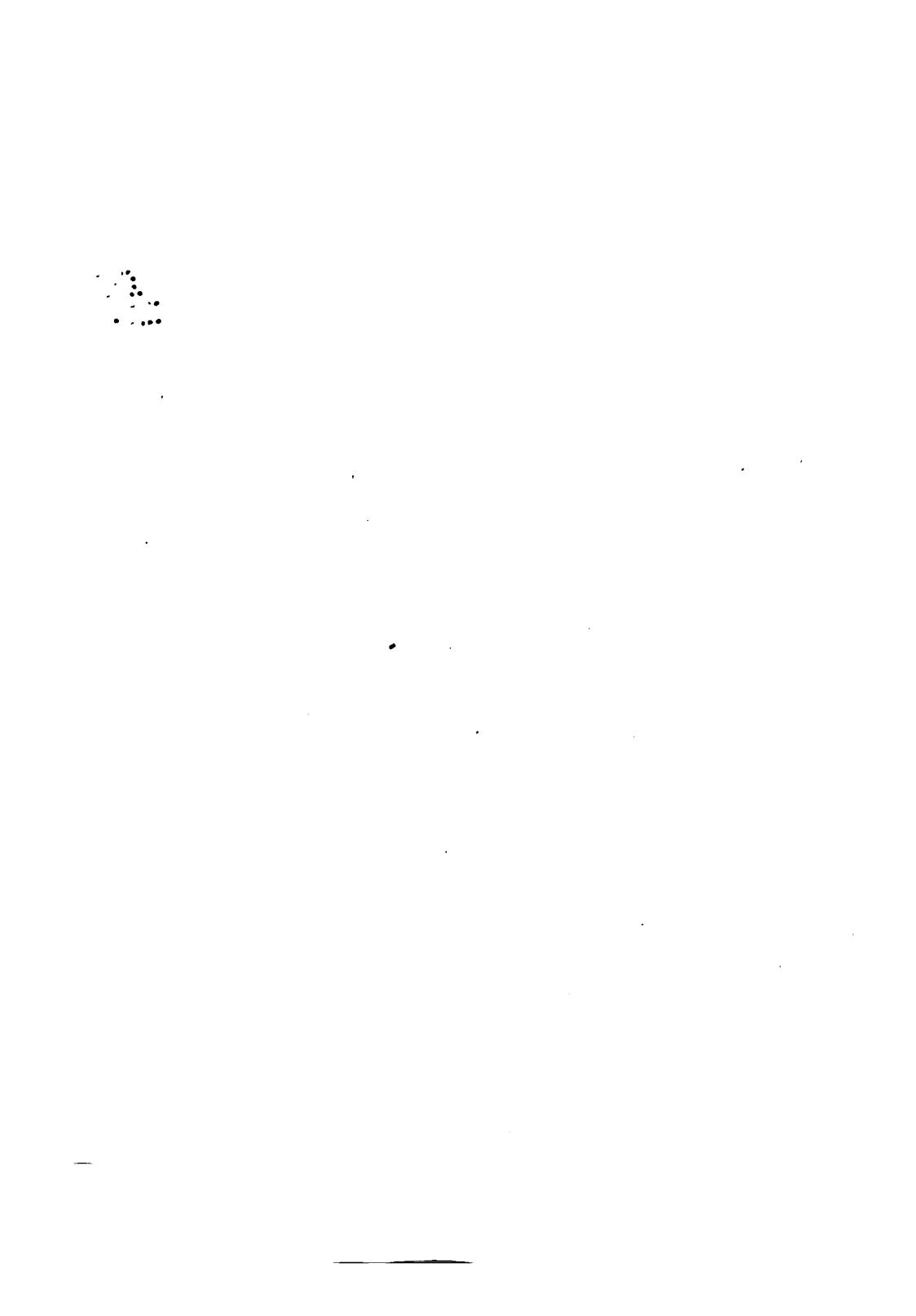
Salesman's Itinerary

A salesman should go direct to Mexico City by rail via Laredo, Texas, for in the Mexican capital are located the largest wholesale houses, many of them with branches in the cities of the interior, and connections can often be made for handling the line throughout Mexico proper, with the exception of Yucatan, which should be considered separately. After working Mexico, the salesman will be able to get a more accurate line on those cities in the interior which it may be safe and advisable to visit.

If it is decided to go by boat, the salesman should take a steamer from New York to Progreso, via Havana, and visit the city of Merida, the commercial centre of Yucatan, which is within easy rail communication with the only

A BUSY STREET IN MEXICO CITY





other city of any importance on the peninsula, Campeche. From Progreso there are weekly sailings of the Ward Line to Vera Cruz, which should be the next stop. From Vera Cruz—which city it will be found profitable to work thoroughly as it is the port of entry of a considerable territory north and south as well as for Mexico City—the salesman could proceed to Tampico, fifteen hours by steamer from Vera Cruz (weekly sailings), which will be found a fairly good market for manufactured articles at present. From Tampico he may either return to Vera Cruz by boat and thence to Mexico City, or he may leave Tampico by rail for Monterey or San Luis Potosi, and thence to Mexico City.

The only other cities which it would be advisable to visit are Guadalajara, Puebla, Monterrey and San Luis Potosi, all within rail communication with the capital, the latter being on the direct route from Mexico City to Laredo.

As to the west coast, a great part of the trade is done with San Francisco and Los Angeles jobbers. Previous to the war, German and Spanish importers had a monopoly of the import and export business in the principal cities, and were in a position to control prices and conditions generally throughout the whole territory. Since the war the large Spanish houses

have been reaping the harvest, but many of the smaller houses have succeeded in breaking away, and are now dealing direct with exporters in the United States. There are also a number of very large and important Chinese houses in Mazatlan, Guaymas, Magdalena, and Manzanillo who have taken a great part of the trade formerly done by German houses.

All of the large importing houses in Mexico City have salesmen travelling the territory, and they rather resent the intrusion of manufacturers' representatives in that territory in search of direct sales from the factory, especially where they are buying from the same factory. Salesmen who intend to visit that territory therefore should look into this phase of the matter before leaving Mexico City. Information can be had in Guadalajara in regard to all the West Coast cities.

The cities on the National Railway line from Laredo to Monterey, Saltillo and San Luis Potosi do a large business with jobbers and exporters along the border, and while some merchandise is reshipped north from Mexico City, as a rule that business should be done direct from the United States.

Travel between Mexico City and Vera Cruz is now comparatively safe, and the whole line

is protected with blockhouses every few kilo-metres through the danger zone. Business conditions in Vera Cruz and Tampico are fair, but handicapped by difficult communications with the interior points, where there are considerable rebel activities, which is handicapping the production and shipping of coffee, and cutting off the consuming power of these rich and formerly prosperous localities, with its consequent effect on sales of merchandise by Vera Cruz and Tampico importers. But few of the large sugar and coffee plantations in the State of Vera Cruz are operating.

Travel on the National Tehuantepec Railway across the Isthmus is possible, but somewhat uncertain, and connections with Vera Cruz and the north by rail are subject to rebel attacks.

New Enterprises

A company of Norwegian capitalists has undertaken development enterprises upon a large scale in the northern portion of the State of Vera Cruz. Their plans include the development of a waterfall for the production of light and power to be furnished to the people of a large area. Lumber operations and the raising of crops on a large scale will also be undertaken.

The amount of capital invested in the company is \$20,000,000 American money, and the company expects to furnish employment to five thousand men.

Announcement has been made of the organization by another group of Norwegians of the Banking Company of Norway and Mexico, with headquarters in Mexico City and a branch in Guadalajara. Besides the regular business of banking, the institution will devote much attention to the enlargement of trade relations between Scandinavia and Mexico, and will seek to attract capital to invest in the productive industries of Mexico.

A project is on foot in Mexico City for the establishment of a series of packing houses at various points on the coast of the State of Yucatan to handle the fish, oysters and other sea products of that region. The supply is varied and inexhaustible, and until the present time little or no effort has been made to take advantage of this source of wealth. It is reported that the necessary capital has already been subscribed and that operations will be commenced in a very short time.

The Mexican consul at San Francisco has recently communicated to the Mexican Government the information that 80,000 Portuguese la-

bourers, skilled in vine culture and wine making, and who have been thrown out of employment by the new prohibition laws of the United States, wish to go to Mexico to establish the wine industry in that country. The Secretary of Agriculture and Fomento is said to have expressed great interest in the proposition, and instructions have been sent to the Mexican consul in San Francisco to inform the prospective immigrants that the Mexican Government will extend any facilities which would be of assistance to them.

The wine industry in Mexico is to be greatly increased in the near future, and the Department of Commerce of Mexico is preparing a report on the advantages in the way of soil, climate, etc., which different sections of this country would afford to growers and producers of wines and liquors, as well as statistics on the consumption of alcoholic beverages in Mexico. In this connection there would probably be a sale at present in Mexico for the machinery, apparatus, stills, etc., taken from dismantled distilleries for use in alcohol and liquor plants.

The Mexican Government has recently given instructions for the construction in the aviation shops in Mexico City of a number of war aëroplanes which will be stationed in different por-

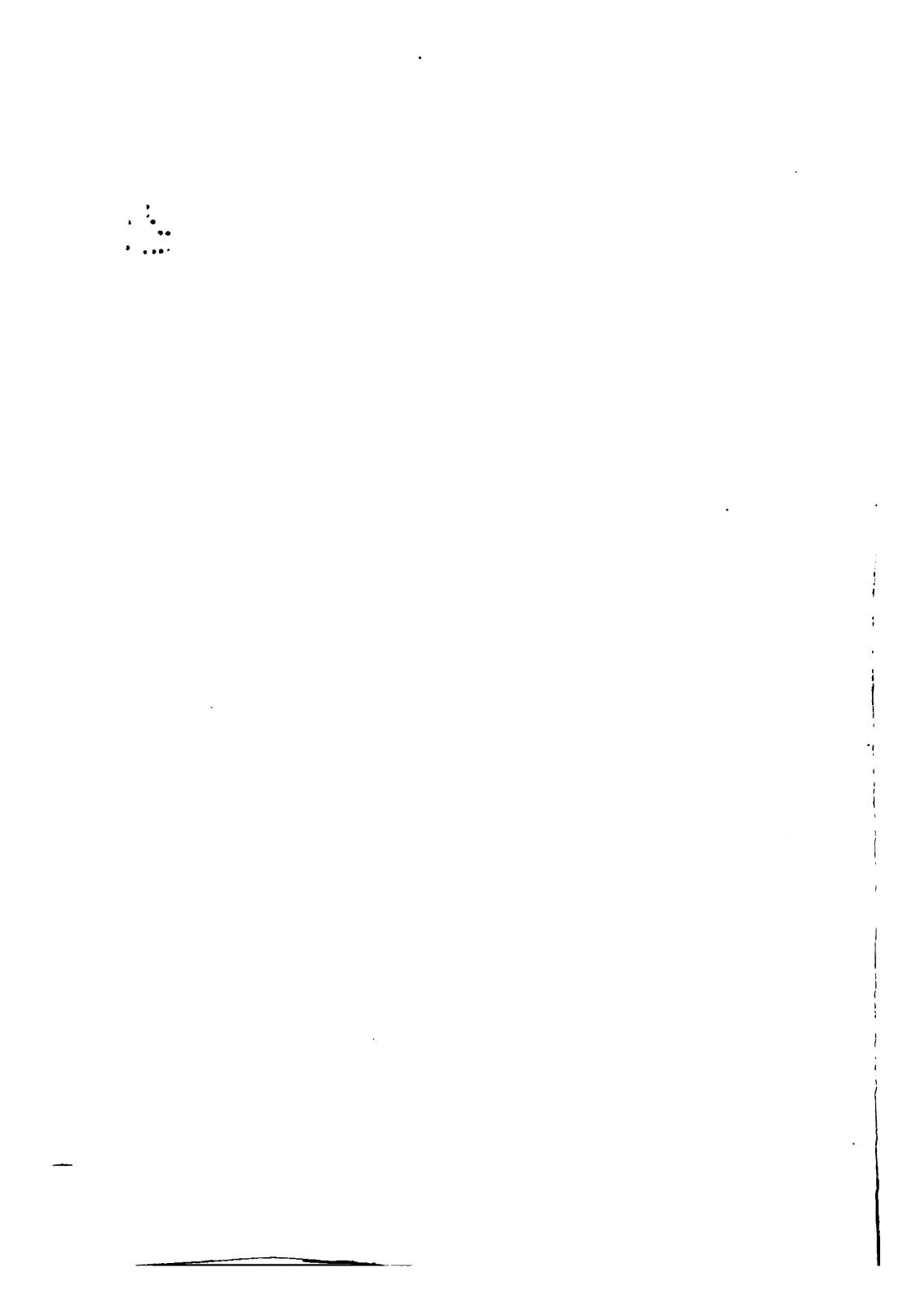
tions of the Republic. These machines will include the latest devices in such matters, and will be built entirely by native mechanics. The motors to be used are known as the "Aztatl," and are the product of native inventive genius.

Manufacturers of paper, printing machinery and inks will be interested to learn that there are in Mexico today 439 newspapers, magazines and periodicals, divided among the various States as follows: Aguascalientes 9, Campeche 2, Coahuila 15, Colima 9, Chihuahua 11, Chiapas 5, Mexico City 137, Durango 6, Guanajuato 28, Guerrero 2, Hidalgo 4, Jalisco 26, Mexico (State) 7, Michoacan 12, Nayarit 5, Nuevo Leon 16, Oaxaca 5, Puebla 18, Queretaro 3, San Luis Potosi 9, Sinaloa 10, Sonora 10, Tabasco 5, Tamaulipas 13, Vera Cruz 27, Yucatan 34, Zacatecas 9, Lower California 2. Of the foregoing 81 are daily papers, 51 are semi-weekly or tri-weekly, 180 are weeklies and tri-monthlies, 33 are bimonthlies, 85 are monthlies and 9 are of various terms of publication.

One of the largest rubber manufacturing concerns in the United States is making investigations for the purpose of determining the most suitable locations for the establishment of four factories for the manufacture of tires and other objects into which rubber enters. The city of



ONE OF THE LATEST TYPES OF RESIDENCES IN MEXICO CITY—BUILT BY THE
MEXICO REALTY AND DEVELOPMENT CORPORATION



Mexico will probably be one location, Monterey another, Guadalajara the third, and Merida the fourth.

Several months ago an automobile factory was established in Monterey, and on June 24, 1919, there arrived in Mexico City the first machine turned out by this new enterprise. These Mexican cars will be known as "El Monterey," and will be native built throughout. The present capacity of the factory is 2,500 cars annually. The Mexican Government will foster the new industry by granting freedom from taxes for a period of years, and the government railways will transport the products of the factory at reduced rates.

Manufacturing in Mexico

Mexico possesses the raw materials for practically all branches of industry, but they are unexploited at home and are exported to other countries. There are some manufacturing establishments in Mexico, but with a few notable exceptions they operate on a small scale, owing to lack of machinery and capital. Among the articles manufactured at the present time in Mexico may be mentioned shoes, blankets, calicoes, cashmeres, fichus, beers, wines, furniture,

pottery, matches, accoutrements, hats. Silk and wax are manufactured—animal as well as vegetable.

The principal shoe factories are in Mexico City, Leon, Guanajuato and Guadalajara. The largest factory is the Excelsior, in the capital. There are small shoe factories in all the Mexican States, owing to an abundance of the raw material. The greater number of hides are, however, exported. There are factories for the manufacture of textiles in Mexico City, Orizaba, Puebla, Jalisco, San Luis Potosi and Queretaro,—practically all of them supported by French and Spanish capital.

The brewing of beer is a flourishing industry in Mexico, and there are large breweries in Monterey, Orizaba, Toluca and Mexico City. The malt and hops are at present imported, although good results have been obtained in hop growing experiments in certain regions. The manufacture of tobacco is one of the few manufactures which have arrived at a state of perfection, cigars and cigarettes of very high grade being made in Mexico City, Orizaba and Puebla. There are two tobacco factories in Mexico City, "El Buen Tono" and "La Tabacalera Mexicana," whose buildings, machinery and general arrangement are unrivaled in any part of Latin

America. The first named is a French enterprise, and the second is Spanish.

Owing to the abundant supply of precious hard woods, there is a growing industry in furniture making. There are enormous supplies of the raw materials for glass making, but the existing glass factories are equipped with antiquated machinery, and their products consequently leave much to be desired.

Japanese Competition

Japanese merchants are making a determined effort to capture a large share of Mexican trade, and are offering merchandise of all kinds at much lower prices than their competitors. A significant event in this connection was the arrival recently of twenty thousand tons of sugar of superior quality at Salina Cruz, on the Pacific coast side of the Isthmus of Tehuantepec, directly from Tokyo. Agents of Japanese silk mills were in Mexico in June, 1919, for the purpose of establishing a central depot and opening branches in all the large Mexican cities for the sale of their products as well as of other lines of dry goods. The Japanese also propose to import various fibres produced in Mexico and manufacture textiles therefrom.

German Competition

A pamphlet issued in May, 1919, by the German electrical trust indicates that Mexico will be a fruitful field for German enterprise, and proves that the propaganda of the Teutons did not diminish to any great extent as the result of military defeat. It says:

"In Munich there was formed in 1918 a German-Mexican society composed of educated people. The purpose of this society was to disseminate information about Mexico, lend impetus to a study of Spanish, bringing about the teaching of the German language and German kultur in Mexican schools, inducing Mexican salesmen to visit Germany and inducing Mexican youths to attend German universities. A monthly paper is also issued, entitled *Deutsche Mexicanische Rundschau*."

In March, 1919, a similar society was formed in Bavaria with a charter membership of two hundred people.

In Renthingen there was incorporated "Almeco," founded by industrial firms. Its purpose was to facilitate the exchange of raw products and other commodities between the two countries. There is also the information so-

ciety of the "Deutsche Mexicanischer Anseidler."

The pamphlet goes on to say that in 1913 Germany imported from Mexico goods to the value of 26,000,000 marks, and exported goods valued at 48,000,000 marks. Then there is made this interesting statement.

"Seventy-five per cent. of Mexico's exports found their way to the United States, which regards Mexico as its warehouse. Of course, these exports will now go to Germany."

Giving details about hopes for relations with Mexico, the pamphlet concludes as follows:

"In 1913 there were 3,000 Germans in Mexico who were merchants, doctors, etc. They moved in the best circles, and are pioneers around whom our German immigrants will from now on settle. Our imports will consist of metals, petroleum, fibres, fruits, woods, etc.

"Our first duty is to secure from Mexico large imports of raw materials and not regard it as a dumping ground for German goods."

American Automobiles in Mexico

During my recent trip to Mexico from the Texas border to Vera Cruz one of the things which surprised me most was the quantity and

variety of American automobiles to be seen everywhere. In Mexico City there is a greater display of machines than one can find in many an American city. On Sunday morning in Chapultepec Park there is a parade of automobiles past the band-stand four lines deep, two lines going in each direction, the cars being so numerous that they can only go at a walking rate. Every make and type of American, French and British car is represented. In the business districts, in addition to all kinds of pleasure cars and motor trucks, there are hundreds of jitneys which carry passengers for short distances for ten centavos (five cents).

During the year 1918, 365 commercial automobiles, valued at \$525,664, and 2,578 passenger automobiles, valued at \$1,653,545, were exported from the United States to Mexico by American manufacturers. In November, 1917, there were in operation in Mexico City 2,165 automobiles, 1,329 of which were for private use and 836 for hire. Among the latter were 150 jitneys and 33 taxis. There were also 2,457 coaches or carriages in Mexico City, of which 900 were for private use and the remainder were for hire.

There has been an especially heavy demand for popular priced touring cars and trucks



"JITNEYS" IN MEXICO CITY



A FULL "JITNEY" LOAD IN MEXICO CITY



—a demand which is traceable to the practical disappearance of Mexico's most popular beast-of-burden, the ox. During the revolution large numbers of oxen were destroyed by the rebels for their hides and this, together with the destruction of thousands of freight cars and the general run-down condition of Mexican railroads, has created a large and constantly growing market for automobiles. One American salesman sold 800 cars in Mexico in six months and during his travels through the country was keenly impressed with the demand for motor trucks throughout Mexico, both in the mining districts and for passenger service. A type of car in great demand is the five-passenger touring car painted black, with leather upholstery and nickel trimmings. The type of motor preferred is six-cylinder with selective clutch, gear box back of engine, full floating rear axle and twelve-inch suspension. The straight side tire equipment with sixty-inch tread is preferred. In commercial vehicles the three-ton type with three to four speed and rear wheel worm drive is given the preference. Big cooling capacity is essential, owing to the extreme heat in some parts of the country.

There is a good demand for trailers and towing hooks.

Orders for American cars are usually placed on the basis of cash f. o. b. factory. Dealers usually require a commission of 20 per cent. on pleasure cars and 25 per cent. on commercial vehicles. Mexican consular invoices are necessary for shipment into the country, the Mexican consul obtaining 3 per cent. of the invoice price as his fee. Customs brokers charge \$5.00 per car for making entries and there is also a municipal or octroi tax of 1½ per cent. Correspondence should, of course, be in Spanish. There is no duty on catalogues and printed advertising matter. There are facilities in Mexico for handling storage batteries, and speedometres should register in kilometres.

Automobile importers in Mexico are doing business today under very trying conditions, among which may be mentioned the delay in obtaining goods, the heavy freight charges and the lack of banking facilities for financing their business. A number of the automobile agents in Mexico have large showrooms in central locations, employ salesmen to travel the interior and maintain large and well-equipped garages and repair shops.

It is probable that there will be a very material increase in the demand for automobiles in Tampico. Several of the most important

American motor truck manufacturers are represented in that city, and there is a slow but sure increase in the use of trucks. The light serviceable type is the most popular, but the oil companies are interested in trucks suitable for heavy and hard work. Practically all of the medium priced cars are to be seen on the streets of Tampico and on the near-by motor roads. The dealers handle all makes of tires and prices range from \$24 for cheap tires to \$118 for the best.

In Yucatan there are about 1,000 automobiles, the greater number of them in the city of Merida, which is often referred to as the spotless town of Mexico. Nearly all standard cars and tires are in use. Motor trucks have recently been put into use by the Mexican military organization in Chihuahua, where operations against Villa necessitate a considerable quantity of motor equipment. There are no exclusive dealers of automobiles or trucks in Chihuahua owing to its close proximity to El Paso, where most of the different manufacturers are represented and from which point that territory is usually controlled.

In sending automobiles by rail to Mexico City they are consigned to a forwarding agent at the border, usually Laredo, Texas, who at-

tends to all details connected with transfer across the Rio Grande (American railway cars do not cross the river), customs, etc. Freight rates from the Mexican side at Nuevo Laredo to Mexico City for automobiles boxed or crated are 67.65 pesos in carload lots and 102.48 pesos in less than carload lots per 1,000 kilos (equal to one ton). Value of the peso is 50 cents.

By water from New York to Vera Cruz the rate for automobiles boxed is 30 cents per cubic foot. The railroad rate from Vera Cruz to Mexico City is 38.40 pesos per 1,000 kilos in carload lots, including handling charges. In less than carload lots a minimum is fixed for each car. If the actual weight of the car is 750 kilos or less and does not exceed 1,750, the minimum weight charged is 3,000 kilos. Over 1,750 the minimum weight is 4,000 kilos, on the basis of the carload rate. In carload lots the minimum weight is 10,000 kilos.

Laundry and Cleaning Machinery

Climatic conditions in Yucatan are such that light washable clothing is generally worn the year around by all classes of people. During the mild months of the winter the well-to-do

classes use light woollen garments, such as serge. During the hot, dry, and very dusty months of the long summer, garments have to be laundered with great frequency and in this connection it may be remarked that the Yucatecans, from the common Indian labourers up, are among the most cleanly people in the world, utmost cleanliness of person and clothing being a matter of racial and regional pride.

The laundry of the common people is done in the home, while that of the better classes is done by hired labour and in Spanish and Chinese laundries. No machinery is used in the cleaning of clothes. There are no steam laundries and no dry cleaners. It would seem that modern installations would pay a good return on investment. The matter of opening modern cleaning establishments does not appear to have received much attention and its promotion probably could best be attempted by correspondence and advertising with young and progressive Yucatecans who have lived in the United States, who know the advantage of mechanical cleaning and who are interested in manufacturing and the importation and installation of machinery.

American Dyes in Mexico

The Mexican consumption of dyes amounts to about \$1,500,000 (United States currency) annually, and there is a splendid opportunity for Americans to capture the trade formerly controlled by German houses. Complaints are made, however, by representatives in Mexico of American manufacturers that it is not possible to secure a complete line from any single dye concern in the United States. Exporters and selling agents in America as a general thing represent a number of manufacturers, with the result that the shades and concentrations of the dyes do not run uniform over a number of shipments. The impression obtains in Mexico that American houses are waiting to renew relations with the local German firms who, previous to the war, controlled the dye business in Mexico.

A valuable opportunity is being lost by any American manufacturer who entertains this intention, for, of course, German dye importers in Mexico will renew their relations with German factories as soon as this is possible. An active representative with a small stock for immediate delivery, and the ability to guarantee a continuous supply of the principal shades, uniform in colour and concentration, would find

it easy to introduce and establish a line of American dyes at present.

Sport in Mexico

Manufacturers of sporting goods and equipment will be interested to learn that many American sports have successfully invaded Mexico, and one of the first letters which I received on my arrival in Mexico City in April last was an invitation to attend a baseball game. There is a fine baseball park near the Paseo de la Reforma, and the Mexicans put up a very good game. The Spanish residents in the capital have taken up football and there are a number of clubs, the principal one being the "España." Football is also very popular in the States of Hidalgo and Puebla. Boliche is of course played all over Mexico, and there are many good tennis and golf clubs. Pelota is another favourite game.

Horse racing has always been a favourite sport in Mexico, and there are hippodromes in Mexico City and in Cindad Juarez, Chihuahua. Physical culture is given by experienced teachers in gymnasiums in Mexico City and elsewhere, wrestling, jiu jitsu and boxing also being taught. The Y. M. C. A. in Mexico City is

a centre for the teaching of all sports, including swimming.

Bull fighting has been prohibited in Mexico City, and at the time of my visit the bull ring, holding forty thousand people, was used on Sundays for grand opera. We attended a performance of "Aïda," excellently rendered by an Italian Grand Opera Company from the United States.

Trade Bodies in Mexico

Following is a list of the local Chambers of Commerce in Mexico, which are legally recognized and in affiliation with the National Chamber of Commerce, whose headquarters are in Mexico City:

- City of Aguascalientes, State of Aguascalientes.
- City of Acapulco, State of Guerrero.
- City of Campeche, State of Campeche.
- City of Juarez, State of Chihuahua.
- City of Mexico, Federal District.
- Industrial Chamber of Agriculture and Mines, Juarez, Chihuahua.
- City of Colima, State of Colima.
- City of Cordoba, State of Veracruz.
- City of Cananea, State of Sonora.
- City of Victoria, State of Tamaulipas.
- City of Chihuahua, State of Chihuahua.

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Industrial Chamber of Agriculture and Mines, City of Chihuahua.

- City of Durango, State of Durango.
- City of Guadalajara, State of Jalisco.
- City of Guanajuato, State of Guanajuato.
- City of Guaymas, State of Sonora.
- City of Hermosillo, State of Sonora.
- City of Irapuato, State of Guanajuato.
- City of Jalapa, State of Veracruz.
- City of Leon, State of Guanajuato.
- City of Laguna del Carmen, State of Campeche.
- City of Matehuala, State of San Luis Potosi.
- City of Matamoros, State of Tamaulipas.
- City of Monterey, State of Nuevo Leon.
- City of Morelia, State of Michoacan.
- City of Merida, State of Yucatan.
- City of Orizaba, State of Veracruz.
- City of Puebla, State of Puebla.
- Chamber of Agricultural Industry, City of Puebla, State of Puebla.
- Chamber of Commerce and Agriculture, City of Paso del Macho, State of Veracruz.
- City of Queretaro, State of Queretaro.
- City of Saltillo, State of Coahuila.
- Chamber of Commerce, Industry and Agriculture, City of Tampico, State of Tamaulipas.
- City of Tulancingo, State of Hidalgo.
- City of Tehuacan, State of Puebla.
- City of Tepic, State of Nayarit.
- City of Toluca, State of Mexico.

Chamber of Commerce of the Laguna District, City of Torreon, State of Coahuila.

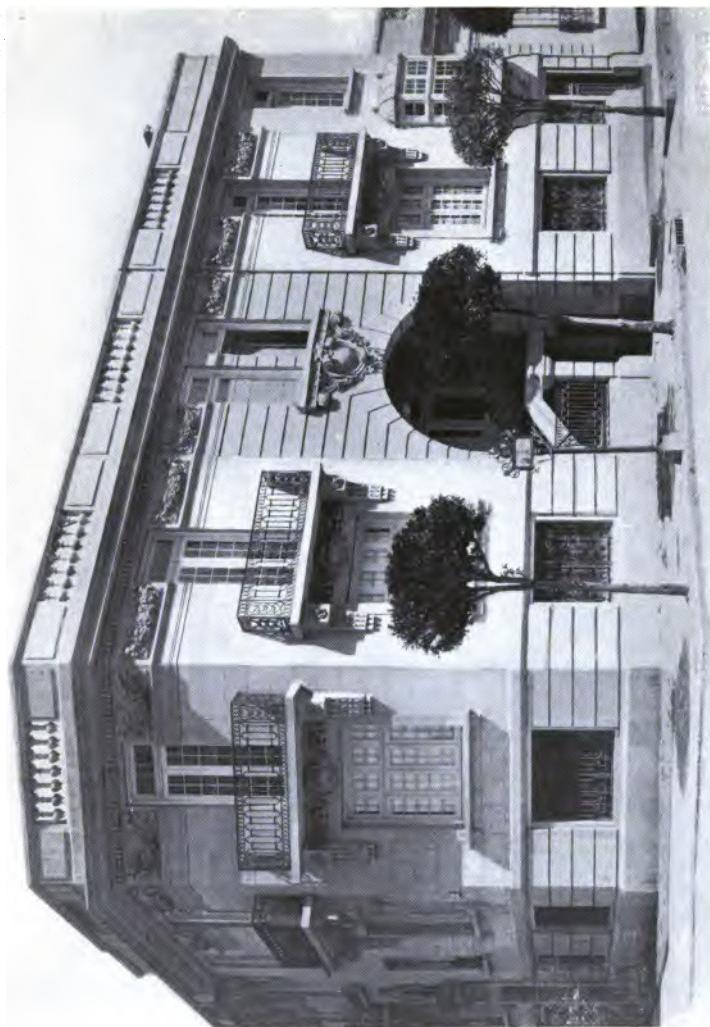
Chamber of Agriculture of the Laguna District, City of Torreon, State of Coahuila.

City of Veracruz, State of Veracruz.

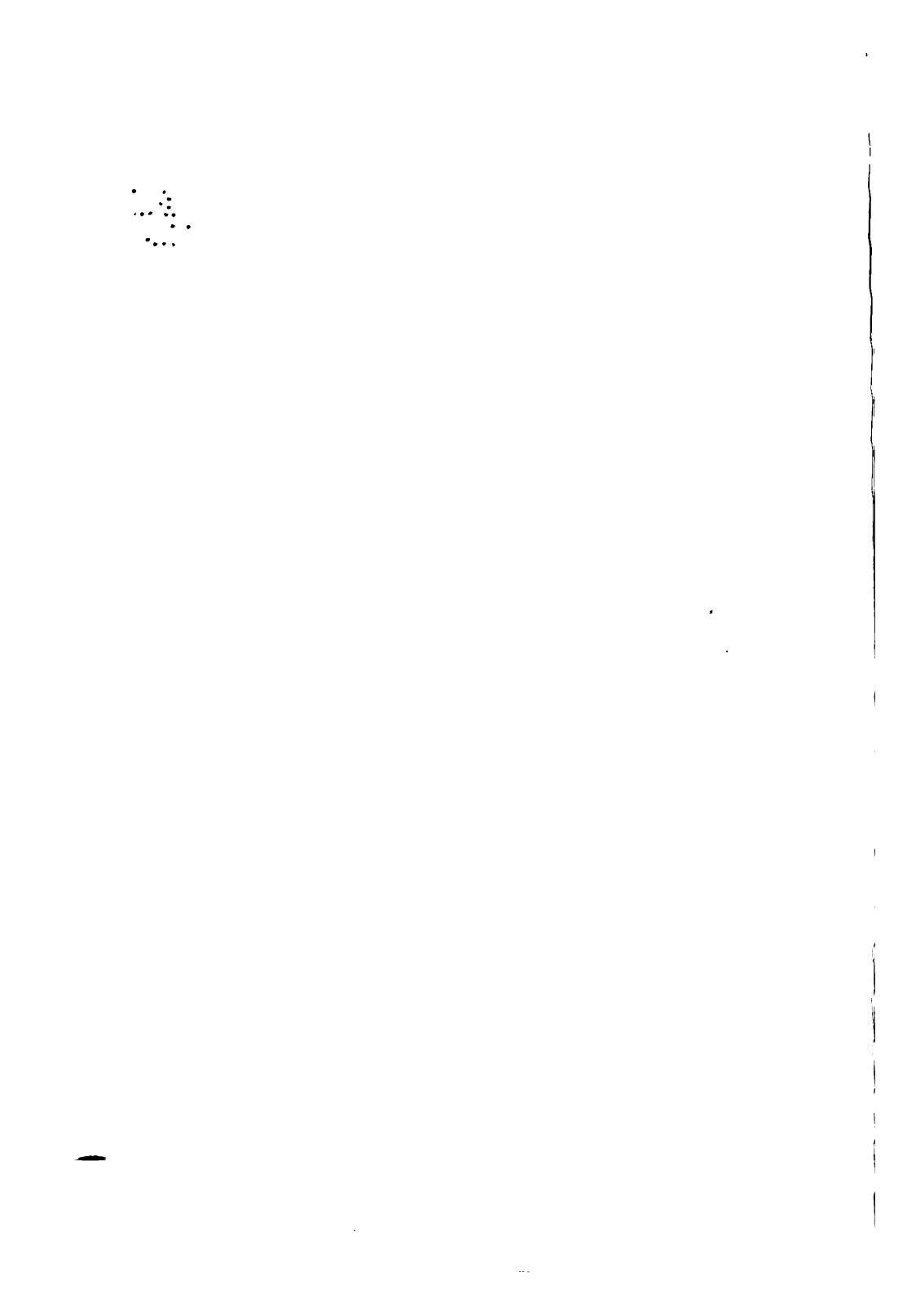
City of Zacatecas, State of Zacatecas.

The committee on transportation of the Mississippi Valley Association trade mission to Mexico reports that arrangements have been made to facilitate the handling of parcel post and express packages over the border and through customs inspection. It finds that one of the most serious handicaps to trade expansion to the south lies in the fact that the American railways will not permit their cars to be through routed to Mexican points, which enforces expensive and tedious reloading into cars of the Mexican National Railways.

A scheme has been worked out whereby a car may be billed through if the shipper furnishes a bond for \$2,500 to insure the return of the car from Mexico and pays \$75 for the return of the car empty over Mexican lines. This is a costly and unsatisfactory arrangement. The committee will appeal directly to the railroad administration to make arrangements for through routing and through bills of lading. Until such a plan is perfected the mission ad-



RESIDENCE IN MEXICO CITY RECENTLY BUILT BY THE MEXICO REALTY AND
DEVELOPMENT CORPORATION



vises the shipment of all goods, except those consigned to cities in the north of Mexico, by boat to Tampico and Vera Cruz.

The Present an Opportune Time

The committee on wholesaling and manufacturing sales, of the Mississippi Valley Association, of which Walter C. Alward of the Chicago office of Carson, Pirie, Scott & Co. is chairman, says:

"It is the opinion of the committee that the present is an opportune time for American concerns to open the way for a larger and permanent trade with Mexico. Conditions in the country today are no worse, as far as the committee can determine, than they have been for the last few years, while in many respects they have improved. Little could be gained either by individual business interests or by the country in staying out of Mexican markets at this time, and there is much to be said in favour of immediately entering that trade." This is the opinion of all those who have investigated opportunities for selling merchandise of the sort carried by the average city shop and of those seeking the products of Mexico.

Mexican Exports and Imports

Following is a list of the articles in general export and import trade:

Exports

- Coffee.
- Henequen.
- Guayule (Mexican Rubber).
- Hule (Para Rubber).
- Cocoa.
- Guano.
- Fibres.
 - Lechuguilla.
 - Ixtle.
 - Zapupe.
 - Palma.
- Candelilla (Vegetable Wax).
- Zacaton Root.
- Hides (Crude and Tanned).
- Cotton.
- Cotton Seed.
- Pochote (Vegetable Silk).
- Plaster.
- Asbestos.
- Graphite.
- Carey.
- Pearl Shells.
- Chicile (Raw Chewing Gum).
- Bones.

Wool.
Petroleum.
Oil Seeds.
Castor Oil.
Ajonjoli.
Almond.
Cayaco or Coyol.
Peanut.
Woods (Construction, Tanning and Colouring).
Cigarettes.
Cigars.
Tobacco.
Fruits.
Algas (Marine).
Vanilla.
Tecalli (Mexican Marble).
Marble.
Medicinal Plants.
Magnesite.
Minerals (Gold, Silver, Copper, Lead, etc.).
Salt.
Sarsaparilla.
Sodium Carbonate.
Colouring Earth.

Imports

Artificial Flowers.
Asbestos.
Asphaltum (Manufactures of).
Athletic Goods.

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Babbitt Metal.
Shoe Paste and Polish.
Brass (Manufactures of).
Oatmeal.
Table Food Preparations.
Brushes.
Buttons.
Automobiles.
Automobile Trucks.
Automobile Accessories.
Cars.
Wagons and Wheelbarrows.
Celluloid Products.
Cement (Hydraulic).
Sulphuric Acid.
Baking Powder.
Calcium Carbide.
Copper, Sulphate of.
Chemicals, Drugs, Dyes, Medicines.
Patent Medicines.
Soda, Salts and Preparation of.
Clocks.
Coal (Bituminous).
Coke.
Confectionery.
Copper (Pigs, Ingots, Bars, Wire, Plates and Sheets).
Cotton Duck (Bleached and Unbleached).
Corsets.
Knit Goods (Wearing Apparel).
Wearing Apparel (other than knit).

Fire Brick.
Tiles.
Batteries.
Electrical Goods in General.
Electrical Machinery.
Telegraph and Telephone Instruments.
Dynamite.
Bags.
Cordage.
Twine.
Smoked Fish.
Pickles.
Oysters.
Canned Fish.
Flavouring Extracts.
Fly Paper.
Dried Fruit.
Metal Furniture.
Glass Bottles.
Glass Jars.
Glass Demijohns.
Glue.
Jewellery.
Hops.
Belting.
Boots and Shoes.
Printer's Ink.
Scientific and Optical Instruments.
Bolts, Nuts, Rivets and Washers.
Castings.

Cutlery.
Enamelware.
Firearms.
Engines (all kinds).
Engines (parts).
Machinery (all kinds).
Machinery (parts).
Pipes and Fittings.
Radiators.
House Heating Apparatus.
Boilers.
Stoves.
Ranges.
Structural Iron and Steel.
Tin Plates.
Terneplates.
Tools (all kinds).
Wire (Plain).
Wire (Barbed).
Metal Polish.
Motor Boats.
Piano Players.
Naval Stores.
Mineral Oils (Petroleum Products).
Vegetable Oils.
Paints.
Varnish.
Books, Music, Maps, Engravings, Etchings, Photographs, and Printed Matter.
Paperboard.

Paper Hangings.
Printing Paper.
Wrapping Paper.
Writing Paper.
Paraffin and Paraffin Wax.
Pens and Pencils.
Perfumeries.
Cosmetics.
Plated Ware.
Roofing Felt.
Shoe Findings.
Toilet Soap.
Surgical Appliances.
Tin Products.
Toys.
Umbrellas.
Zinc Products.

A bank in San Francisco in its monthly letter for July, 1919, makes the following statement:

Our trade with Mexico, while important, is trifling compared with its possibilities, and needs systematic and probably organized exploitation. Western Mexico has not been seriously affected by the disturbances in that country, which, in any case, seem to have degenerated into ordinary banditry which cannot last much longer in the face of modern means of suppression. To the eight or ten ports of call on the west coast we now ship by regular steamer lines between 60,000 and 70,000 tons of general merchandise and

mining supplies, besides lumber and whatever is taken by small tramp steamers. Normally the ports on the east side of the Gulf of California should get much more by rail, but the rail service is through the disturbed district. We import very little except from Salina Cruz, from which we get coffee and some other tropical products, the tropical zone beginning a little north of the southern extremity of the peninsula of Lower California. All these ports have more or less extensive hinterlands, that tributary to Acapulco being especially large and attractive. As a practical proposition as distinguished from talk leading to nothing in particular, this west coast of Mexico would seem to be one of the first regions to be studied. This study would have to be made by agents who speak the local language, who are sympathetic with the Latin American nature and who have adequate capital at their demand for both trade and investment.

Trade-Marks and Patent Laws

Registration of trade-marks in Mexico is valid for a term of twenty years and may be renewed. The fees payable in connection with applications are as follows: Government registration fee 5 pesos; stamp on power of attorney 10 centavos; stamp on application 50 centavos; stamps on application for legalization of consular certificate and on the certificate of legalization 50 centavos each. Applications must be

typewritten on paper 330 by 215 millimetres with a margin of 54 millimetres on the left. The application must be accompanied by a description of the mark with claims in triplicate, an electrotype, twelve copies of the mark and a power of attorney if application is not made by the owner. A separate application must be made for each mark to be registered. Ownership of trade-marks in Mexico is based upon priority of application but during the first two years it is possible to secure the cancellation of marks improperly registered. After two years registration is conclusive proof of ownership. The law provides for the protection of commercial and trade names without registration. Notice of applications for registration is supposed to be given by publication but as the applications are usually published about a year late it is unsafe to rely upon such notice.

Mexico is a party to the international arrangement for the registration of trade-marks with headquarters at Bern and by a single registration in Bern citizens of countries adhering to the convention obtain registration in Mexico as well as in the other signatory countries. This form of registration is not open to citizens of the United States. Neither is Mexico a party to the Pan American Trade-mark Convention

under which a bureau for international registration has recently been established at Havana. Applications must therefore be made directly to the Mexican Office of Patents and Trade-marks. Registered trade-marks as well as electrotypes for use in connection with applications must show the words "Marca Industrial Registrada" or "M. Ind. Rgtrda" if for factory marks and the words "Marca de Comercio Registrada" or "M. de C. Rgtrda" if for marks used only by dealers. The registration number and the date of registration must also be shown and a place for these data should be left on the electrotype. Unless the mark consists solely of a design or figure without words, the name of the applicant and the location of the establishment must also be shown and these must likewise appear on the electrotype.

Patents are registered at the Oficina de Patentes y Marcas, Calle de Filomeno Mata 8, Mexico, D. F. The applications must be typewritten on paper the same size as that indicated for trade-mark applications and must bear a stamp of fifty centavos. The application should show the name of the inventor, the name given to the invention, the object of the invention, the name and residence of the agent and address of the applicant, and must be accompanied by a

triplicate description of the patent ending with a "reivindicacion," that is, a clear statement of the elements constituting the invention. Triplicate drawings must also be furnished as well as a model if required. If the application is satisfactory, the applicant is directed to pay the fees. The fee for a provisional patent valid for one year is five pesos, while for a regular patent valid for twenty years the fee is forty pesos. A provisional patent may be converted into a regular patent within one year upon payment of an additional fee of thirty-five pesos. For examinations to determine the novelty of an invention, a charge of twenty pesos is made. No working of the patent is required but after three years the courts may direct patentees to license the use of inventions by others if the invention is not available to the public on a sufficient scale. Before such compulsory license will be granted, however, a hearing is held and the compulsory license may be revoked at the end of two years. One-half of the net profits arising in such cases are given to the owner of the patent.

The Mexican trade-mark and patent laws have remained practically unchanged for a number of years. Previously there was considerable complaint about the pirating of American trade-

marks in Mexico, but apparently such cases are less frequent now. The separate States have no jurisdiction in matters relating to trademarks and patents. Applications must be in the Spanish language and it is preferable that they be made out by the representative of the applicant in Mexico. It is also preferable that the electrotype be made up in Mexico in order that all of the required data may be included. Protection for trade names may be secured by publication in the prescribed form. A stamp of one peso must be attached to the application for publication.

CHAPTER VIII

SUGAR AND COFFEE PLANTATIONS

Sugar mills resuming operations. Equipment needed. Opportunities for American capital. Large scale operation. Coffee production.

OWING to the destruction of some of the cane sugar producing factories in the State of Morelos, but recently freed from the grip of the bandit Zapata, and to rebel activities in the State of Vera Cruz, the production of sugar in Mexico during the last few years has been considerably reduced—so much so that in 1918 it was necessary to import thousands of tons from Cuba to make up the amount needed for domestic consumption. In 1911, before the revolution, the production of Mexican sugar amounted to 160,000 tons.

The sugar mills are, however, resuming operations in many parts of Mexico, and present prospects are for a crop of 115,000 tons for 1919–20. In the west coast States of Sonora and Sinaloa, where the irrigated sugar plantations of the Almada Company, Redo & Co. and the United Sugar Companies (American), are

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located, rebel activities have had hardly any effect upon operations, which were only interfered with once, in 1916, by a Villa raid. The Cuatotlapam sugar mill on the San Juan River in the State of Vera Cruz, owned by E. V. Weems of Winchester, Virginia, is running, and so are the following sugar mills: Oaxaqueña mill at Santa Lucrecia, Vera Cruz, the Santa Fé mill at Tlacotalpan, the Paraíso Novillero mill and the Motzorongo mill, both in the State of Vera Cruz.

One of the leading sugar mills in the State of Oaxaca is that at Niltepec, on the Pan American Railway. The annual production of this plantation and mill is 1,000 to 1,500 tons of white sugar and 100,000 to 125,000 litres of alcohol of ninety-six degrees. The company is at present planning to extend its plant in order to increase its output to 3,000 tons of sugar a year. Another sugar mill and plantation in the same State are located in Laolloag, producing each year about 300 metric tons of sugar, although capable of turning out 1,000 metric tons. A third company owns a plantation in Mixtequilla, about four kilometres from Tehuantepec. The output of this estate ranges between 160 and 165 metric tons a year.

As a result of my recent tour through Mexico

I met N. A. Helmer, a New York engineer who specializes in sugar machinery, and who was down there making an extensive investigation regarding the conditions surrounding the operation of the irrigated sugar plantations of the United Sugar Companies located at Los Mochis, State of Sinaloa, about 600 miles south of Nogales, Ariz., and fourteen miles south of the port of Topolobampo, which is the terminus of the Kansas City, Mexico and Orient Railroad.

There are two distinct plants at Los Mochis, known as the Aguila and Mochis, the acreage of the two plantations being about 140,000 acres, approximately one-tenth of which is under cultivation. The cane grown here is mostly a purple variety, fairly straight, with a rind exceedingly hard and high fibre content never less than 12 per cent. and sometimes as high as 16 per cent. Cultivation is largely carried on with traction engines, although mules and oxen are also used. The labour is largely Indian and Mexican, housed in colonies located near the points where they are employed. To induce labour to remain, supplies are sold to them at cost or less from the commissaries operated by the company. There are two irrigation plants affording an ample water supply, the system of

canals being complete and highly organized.

The market for the products of these plantations is entirely Mexican. They grow about twenty-five tons of sugar cane to the acre, yielding about 10 per cent. of white sugar and about three gallons of alcohol to the ton of cane—the alcohol being about 96 per cent. anhydrous. Manufacturing costs are about \$12 per ton. The market for sugar is along the west coast to Mazatlan and large quantities are shipped north to Nogales, thence in bond to El Paso and Laredo as distributing points to Central and Eastern Mexico. The market does not demand an extremely high grade of sugar. Only one grade is produced; namely, a fine grained hard cube sugar sold in paper-lined sacks.

In talking over the political conditions in the districts visited by Mr. Helmer he said, "My observations have led me to believe that the newspaper reports of outrages are exaggerated and that the conditions are far better than those existing twenty-five years ago in Kansas or other poorly policed agricultural States of the West. I believe that conditions in Mexico will improve rapidly as soon as our government assists Mexico by permitting the introduction of military supplies on the distinct understanding that effective repressive measures are to be un-

dertaken against brigandage of any description, so as to permit the demobilization of a portion of the labour now in the military service."

Equipment Needed by Sugar Plantations

The equipment needed by the sugar industry includes evaporating machinery, such as vacuum pans and multiple effect evaporators, boilers, pumps, piping, valves, fittings, fire brick, structural steel for buildings, tank material, distilling machinery, cotton and jute sacks for sugar, cans (and boxes to contain them) for alcohol, casks, cooperage machinery, electrical equipment for lighting and power, hydro electric machinery, plantation railroad equipment, mechanical ploughing equipment, agricultural tools, live stock, chemicals for clarification of sugar juices, office equipment, and internal combustion motors.

The sugar industry in Mexico offers one of the most productive opportunities for the investment of American capital and the introduction of modern machinery. Mexico is in many respects an ideal sugar producing country, and it might rank with Cuba if as much attention were given to the crop in the one country as in the other. Sugar cane grows in practically

every State in the Republic, and it is due to the primitive methods employed that Mexico has not entered more largely into the sugar export trade. Plantations of sugar cane covering in all hundreds of thousands of acres exist in the States of Puebla, Morelos, Vera Cruz, Oaxaca, Sonora and Sinaloa.

The industry is at present carried on both by the wealthy planter, with his hundreds of thousands of dollars invested in lands and refineries, and by the poor renter, with his few acres of ground, his wooden rolls and copper kettle. The rich man produces the refined white sugar, and the poor man produces the various classes of brown sugar, known in Mexico as "piloncillo" and "panocha," which when fresh resembles maple sugar, and which are used to sweeten beverages.

Lands on the elevated levels yield less but richer cane than that planted on the lowlands, and attempts in recent years to grow the sugar cane on the plateau have met with decided success. From twenty-five to forty tons of cane per acre is stated to be the average yield on the elevated plantations and from forty to sixty tons in the tropical lands. The cane, especially on the Gulf slope, grows to an enormous size,

and does not need a heavy outlay for its irrigation and cultivation.

It is safe to say that not more than 10 per cent. of the land available in Mexico for the planting of sugar cane is utilized. There is a large field in the country for the best class of refining factories, although before the revolution there were over two thousand sugar mills in Mexico, large and small. There is a tendency to increase the acreage under cultivation and to modernize the methods in the refining of the raw material.

It is in large scale operation that real money is to be made in Mexican sugar. For a plantation having 6,000 acres in cane, with the proper machinery and buildings, the working capital should be about \$1,250,000, exclusive of the land. Such a plantation would handle about 1,000 tons of cane a day of twenty-four hours. They would probably grind about 120 days in the year, which would mean that they would have to raise 120,000 tons of cane. The average cost of cane in Mexico should not exceed \$2.50 a ton delivered to the factory.

Mr. Helmer was kind enough to furnish me with some operating data which showed that a modern factory operating on average cane from

irrigated lands would produce about 10 per cent. of white cubed sugar, and this cane being of a very high fibre content would almost supply all of the fuel required to manufacture the sugar, the limit to the fuel economy being the extent to which the exhaust steam was utilized in multiple effect and for heating the juices.

On new alluvial lands, the quantity would be generally less on account of the rank growth of the cane tending to produce gums and invert sugars rather than sucrose or crystallizable sugar, although after a term of years the juices would become richer and the tonnage of cane decrease.

The average Mexican factory for the production of sugar contains a great deal of very high-class and expensive machinery, but as a general thing very little attempt is made to obtain the engineering refinements, particularly in the matter of heat economy, that so distinguishes the modern Cuban or Hawaiian factory, and, to an even greater degree, the American beet sugar factory.

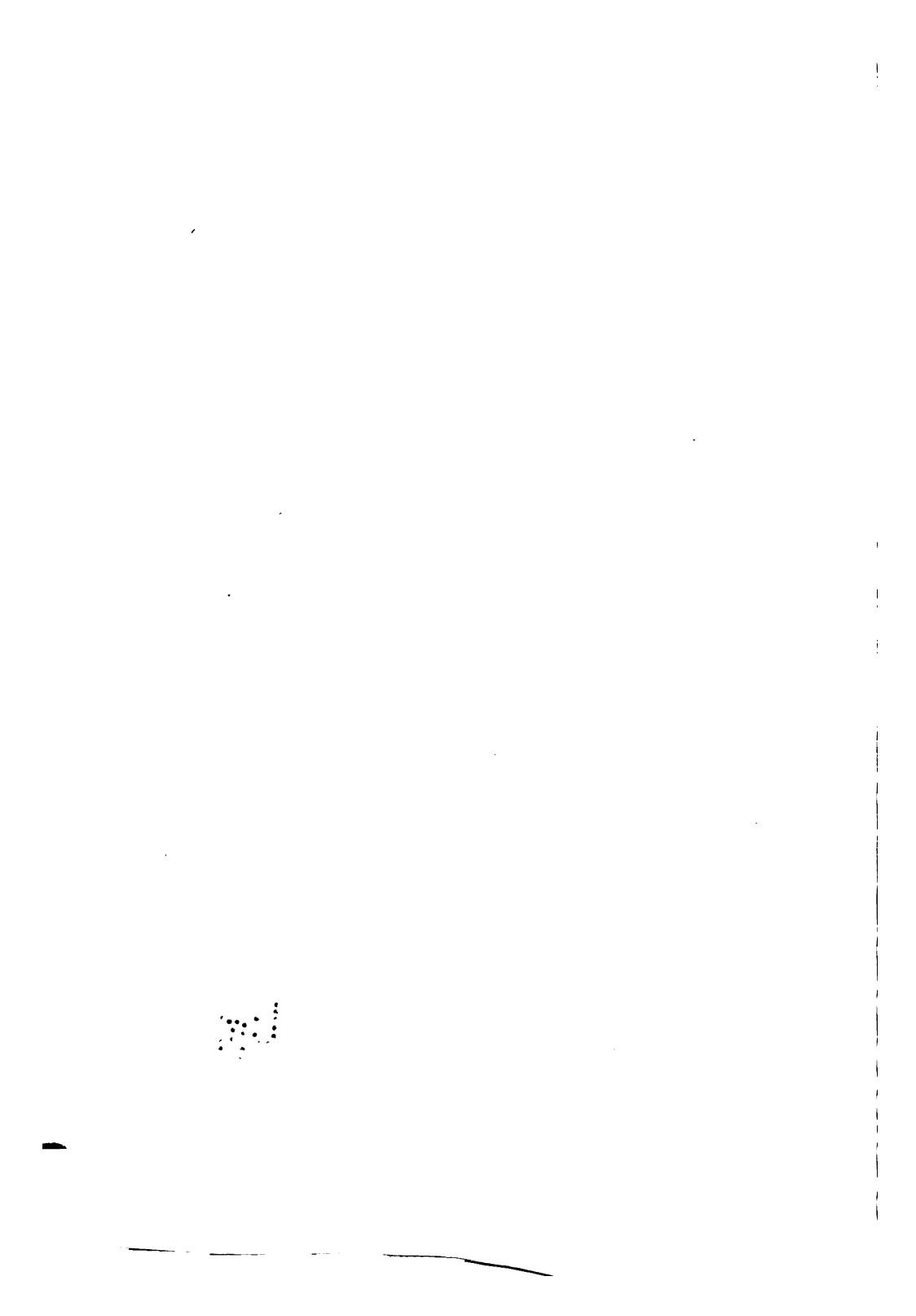
It would appear that in the reconstruction of such plants as may have been damaged during the revolutionary period, it would be desirable for the owners to study this feature of plant



COFFEE DRYING NEAR JALAPA, MEXICO



GRADING COFFEE IN MEXICO



equipment or engage an expert, as the use of additional fuel requires a great deal of common labour to obtain it, considerable transportation equipment to bring it to the plant, additional labour to use it, and, most serious of all is the fact that wood fuel is a very scarce article except on the coastal plain along the Gulf.

Coffee

Although the competition with Brazil is keenly felt by coffee planters throughout Mexico and Central America, coffee growing has not decreased except in certain districts, notably in Vera Cruz, where rebel activities have interfered with production and shipping. The zone with the largest comparative production is to be found contiguous to the Isthmus of Tehuantepec. In general the State of Colima, with some districts of the States of Puebla, Morelos, Jalisco, Hidalgo, Michoacan, Mexico, and Tepic, produce coffee crops, and while Vera Cruz in normal times leads all other States in the quantity of its output, the State of Colima and the Uruapam district of the State of Michoacan, grow the finest quality. It was from a plantation in Colima that a shipment of coffee was

annually made to the former German Kaiser.

Coffee in Mexico is generally grown at an elevation of 2,000 to 5,000 feet. In certain districts the plantations are situated below 1,000 feet, but it is a recognized fact that coffee grown at such low levels is inferior in quality. The only redeeming feature is that the quantity produced is so much greater, which compensates the planter for the lack of flavour and consequent lower price. The production per acre runs from 250 to 500 pounds. These results are obtained from ordinary cultivation, but they can be greatly augmented by improved methods, as no plant more readily responds to high cultivation than the coffee tree.

The amount of coffee grown in Mexico in normal times varies from 77,000,000 to 110,000,000 pounds, and the amount exported is about 39,600,000 pounds. The number of coffee trees to the acre varies from 500 to 1,000. The usual life of the tree is about forty years, but it is in its prime from the sixth to the thirteenth year. After the plantation is well organized and on a paying basis, it is only necessary for the owner to be on it during the picking season, which comes in the delightful months of winter. In fact it is perfectly feasible for a man to run a fruit farm in the United States and a coffee

plantation in Mexico at the same time; thus the winter season, which is a dead loss to many American agriculturists, could be used by them in coffee production. It cannot be too strongly emphasized, however, that bandits and rebels are still active in some of the best coffee growing districts, and no American should venture either his money or his person until he is assured of adequate protection to life and property.

CHAPTER IX

CREDIT AND BANKING

Local banks. American trade largely on cash basis.
Bank credits. Sales terms of American manufacturers trading with Mexico. Mexican bank finances shipments. New Banking Law.

The business being done at present by local banks in Mexico City consists almost entirely of foreign exchange transactions, and even in this line of business they have to meet the competition of street brokers, who are able to handle such transactions at a smaller margin of profit for the reason that they are under little or no expense.

Some of these banks are handling commercial credits to a limited extent, and make advances on Bill of Lading with insurance policy attached covering local shipments, at interest charges of from 3 to 5 per cent. per month. One local bank is financing a limited number of import shipments from the United States through their New York correspondents, but only for the accommodation of old clients, and usually at terms not to exceed thirty days.

Deposits are accepted by banks up to limited amounts, and in some cases a charge of 1 per cent. is made for the privilege, the banks having neither the means nor the desire to invest money entrusted to their keeping. The usual loan and discount features of the banking business are not being handled by local banks, and the interest on such loans as are made has been as high as 2 per cent. per month.

In other words, the business now being done by these institutions is on a day-to-day basis, with no evidence of that permanency and stability which is essential to a successful banking business. The lack of confidence and apparent feeling of uncertainty which prevails among bankers in Mexico today may be explained by the fact that many of them have passed through the difficult days of the revolutions, and have suffered losses arising from the chaotic monetary situation which prevailed until the present gold standard was adopted. As a result the banking business is being conducted in such a way that if these institutions were called upon to liquidate, they would be able to do so at short notice, and a minimum loss.

This lack of banking facilities in the real sense of the term has occasioned great difficulty in local commercial transactions by eliminating the

use and advantages of credit almost entirely, and taken in connection with the lack of circulating medium which prevailed for a time, has been a distinct handicap commercially.

American trade with Mexico during the last four and a half years has been on a strictly cash basis with few exceptions. American commission merchants and manufacturers' agents and representatives have been obliged to insist on a partial payment in cash of the invoice value of import orders, the balance usually covered by sight draft against documents, payable either in New York or at a Mexican port of entry.

A considerable share of business being placed by Mexican importers is being financed by credits opened by them with New York banks against which shippers may draw at sight for value of invoice, and some of the larger importers in Mexico have found it profitable to appoint buying agents in New York and elsewhere who attend to their purchases, the shipping of their orders, and in some cases to the payment of invoices. For this service a commission on total annual purchases is paid, the amount of the commission varying with the nature of the business, but usually not over 5 per cent.

This latter arrangement has been satisfactory to importers in Mexico because it enables them

to take advantage of the cash discount allowed by the factory, and by bringing them into closer relations with the manufacturer, insures them the best export prices, rapid handling of shipments, and close contact with the developments of the trade in their line of merchandise.

An intimate knowledge of business methods in Mexico, of the intricacies of the Mexican tariff and especially of the quality and price of the merchandise saleable in Mexico are requisites and essentials of handling such a business successfully by agents in the United States. Under present conditions there is a large field in Mexico for the development of this branch of export business, and reliable houses in the United States which may be equipped to handle it could make important connections in Mexico, especially if they were willing to finance purchases themselves instead of being obliged to ask the purchaser in Mexico to open a credit in their favour for the payment of invoices.

It is certain that the bulk of Mexico's import trade will be done in the future on a credit basis, and while our proximity will always give us a certain advantage in competition with European manufacturers, other factors such as price and quality being equal, they have on the other hand the distinct advantage of entering the field

prepared to extend credit while American manufacturers and exporters with but few exceptions are still trying to maintain a cash basis.

It is apparent that our competitors for Mexican trade are closely in touch with the situation and its possibilities for the future, and have been quick to see the advantage of the entering wedge which liberal credit terms will give them in re-establishing their former trade with Mexico. In a word, they are ready to accept whatever of risk there is in the situation, and to be successful we must do likewise.

There are in Mexico many houses of entire responsibility in every line of trade, and the matter of extending credit should be left to the discretion and good judgment of the representative or agent of the manufacturer or exporter who is on the ground, and who by careful selection and personal contact with the most important concerns will be in the best position to determine whether or not credit should be extended, and on what terms. The personal investigation on the part of the man in the field should in all cases be supplemented by a report from a reliable bank with American connections, or from a credit agency.

Owing to the number of inquiries received regarding present credit conditions in Mexico, the

National Association of Credit Men has recently completed an investigation of the sales terms employed by representative members of that Association who are doing business with Mexico. The following are extracts from the replies received from firms handling various lines in demand in Mexico:

Manufacturers of Stockings. All of our business with Mexico for some time past has been on a cash in advance basis.

Knitting Company. We have several very reliable customers in that Republic to whom we have been shipping merchandise regularly for years. This merchandise goes forward to them with draft attached to documents which are delivered against the acceptance of draft at sixty days' sight. We have also a number of customers who have just started with us from Mexico, who have been sending us cash or draft with their orders. We believe that the general business condition in Mexico has not improved so materially, but believe this country will be very desirable in the next six months.

Cotton Goods. Owing to conditions existing in Mexico we required, until recently, cash in New York, but have within the past few weeks decided to ship merchandise to the best of the Mexican houses on a basis of sight draft at des-

tination or thirty or sixty days' accepted draft against documents.

Manufacturers of Oil Cloth. We are making shipments to Mexico under three sets of terms, namely, cash in New York before shipment goes forward, sight draft documents attached, and open credit (cash upon receipt of documents). While we have been extremely careful and still are regarding Mexican credits, we believe conditions are improving and we are gradually modifying credit restrictions, depending of course upon the account and our knowledge of the financial conditions of same.

Manufacturers of Paper Bags. For the past three or four years all shipments made by us to Mexico have been on terms of cash with order, letter of credit subject to draft or draft with documents attached at the border.

Manufacturers of Signals. Our business is done almost exclusively with railroads and since the disturbed conditions in Mexico we have sold all materials sight draft against bill of lading, New York.

Manufacturers of Watches. Most of our transactions down there have been made under what we call regular account. The party has had to prove to us most satisfactorily their credit standing and we have never allowed our

accounts to go much over \$1,500 or \$2,000. In other shipments that we may have made to Mexico during the time of the war terms have been documents against payment through either a New York representative of the concern, merchandise remaining in the banker's custody against payment, or to some duly endorsed bank representative in Mexico.

Manufacturers of Tools. We do not care to do much business with concerns in Mexico except on terms of draft with documents attached.

Manufacturers of Roofing Material. Most of our business in Mexico is conducted on a cash against documents basis. When accepting an order from a concern we have had no previous dealings with, we generally ask them to open a credit with a New York bank, unless we can obtain positive assurance that our documents will be taken up promptly upon presentation, in which case we draw on the customer at sight. If we find later that our bills are being met promptly, we do not hesitate in extending to such customers our thirty or sixty days' acceptance terms. Quotations on our products at the present time are f. o. b. cars, New York, and when drawing our drafts we include the amount of our invoice, plus ocean freight, marine and war risks.

Manufacturers of Pipe. Up to recently a good many of the Mexican houses in good standing have had their goods shipped through Nogales, Ariz., and billed accordingly. Payments have been made to us through their Nogales offices, and as these houses were of unquestionable standing we did not hesitate to fill any order that came before us. We have also had a few transactions with houses located in Mexico City, but their standing was so high that we at their request and risk made shipment on open terms, and have already received our money. We are now negotiating with a certain party to represent us in Mexico and have given instructions that credit against orders taken should be opened in New York, or if necessary to sell goods on sight draft against documents, payment to be made on arrival of the goods in Mexico on these terms. We feel that conditions in Mexico at the present time are not sufficiently staple to sell goods on open terms.

Manufacturers of Rope. Whatever business we are doing with companies in Mexico is being handled on a cash basis.

Refining Company. On our shipments to Mexico, we either receive check in advance or else have a confirmed credit opened up in this

country, against which we draw with bill of lading attached.

Manufacturers of Ploughs, etc. Our business with customers in Mexico during the past year and a half, has been somewhat more active than for several years prior to that time. Even at that, though, the volume is not anywhere near the amount which we enjoyed prior to the revolution, about 1913. The unsettled conditions have compelled our restricting shipments in many cases to a cash-in-advance basis, even to some customers who prior to the revolution were regularly extended credit on terms of sixty days net, 2 per cent. for cash in ten days. At this time, there are probably one half-dozen of our old well-established customers to whom we ship goods, invoices amounting from \$3,000 to \$3,500 on open account, terms sixty days net, 2 per cent. cash in ten days. The balance of the business is handled either cash in advance or cash against documents at the border.

Manufacturers of Medicine. It has been the policy of this house to request "cash with orders" for the past two or three years.

Wholesale Dealers in Stationery. What we have been doing has been strictly on a cash basis, and only in one or two places around Yucatan.

Manufacturing Chemists. All of our transactions with parties in that country have been made on a strictly cash basis.

Bag Manufacturers. On shipments to Mexico we ask for cash in advance. Shipments are made to the customer direct through forwarding agent at border.

Manufacturers of Shoes. We have not been shipping direct on open account to any but the largest concerns of unquestionable standing until very recently. We have a few accounts in Mexico to whom we have been selling through the disturbing period on open account, but on other accounts we have either asked them for payment in advance or have required some sort of confirmed credit to cover their orders. Just a short time ago, our salesman went through this territory, and we are now arranging to handle orders in this section both on open account basis and in some cases—draft against documents at Laredo, Texas, or some other border city. Our credit information in these accounts consists largely of the information gathered direct by our salesman when he took the order, from bankers, business houses, etc., and the usual commercial credit reports. You will see by the above that our method of handling Mexican business has not been standardized yet,

as it has appeared to us that conditions in Mexico are such that it is impossible almost to standardize any method of handling credits there just at this time. It is much safer, in our opinion, to take each particular order separately, and let the method of handling same be governed by the prevailing circumstances.

Manufacturers of Electrical Supplies. We have no fixed manner in which we are extending credits to Mexican buyers. In some instances we are insisting upon full payment with the order, and we also ask the following terms: (1) One-half payment with the order and the balance draft against shipping documents. (2) Full payment against shipping documents. (3) Where the companies are owned by American capital we are extending open credit.

Manufacturers of Glass. We have a very small business in Mexico and on account of the unsettled conditions there, we have felt it better to hold these few customers to a cash basis. There seems to be just a little more activity at this time than in the past.

Manufacturers of Scales. With two or three exceptions, all business with Mexico is handled on a cash-before-shipment basis. The exceptions are firms to whom we have sold on open account for a number of years and their credit

standing and ability to pay their bills is unquestioned.

Manufacturers of Furniture. Under ordinary conditions we have shipped into Mexico under our regular terms of 2 per cent. thirty, net sixty, bills payable in New York exchange, and we are pleased to admit that we have had very little trouble with our Mexican accounts.

Manufacturers of Shoe Polish. We have our representative in Mexico, who also has an office in Vera Cruz and Monterey and our business with Mexico is done on the basis of a remittance from customer prior to shipment, or cash deposited in New York against documents less discount for cash, as our representative being on the ground, is able to notify the customers and see that drafts are accepted and taken care of.

Manufacturers of Abrasive Materials. We are making very few shipments to Mexico on a basis of sight draft attached to bill of lading. Our terms have been and are now C. O. D. border or port of entry with the usual advance payment of 10 to 25 per cent., guaranteeing freight in the event of non-delivery. From this, however, we make some deviations in that where an account is established with us in the way of meeting its obligations promptly on C. O. D. basis we sometimes waive the requirement of

advance payment. We make another deviation to a certain class of merchants whose responsibility we consider unquestionable and ship them on a C. O. D. basis, being careful of course always to watch to what particular part of the Republic they go and another exception is made in that we have a few accounts whose terms are what we might term regular, meaning sixty days. Those were our regular terms to Mexico prior to the time that we placed them on a C. O. D. basis. Those exceptions, however, only represent a small percentage of the accounts that we now handle in Mexico. The matter of credit really is a question of confidence and mutual understanding between the manufacturer and exporter and their clients in Mexico.

Powder Works. The general trade conditions in Mexico show no great improvement over the past several years due to the general demoralizing conditions in industry, including transportation, although the prospects point to a steady, if gradual, improvement. To the large mining companies of known financial ability and credit standing we are willing to extend credit according to our regular terms applying in this country, namely, thirty days net or 2 per cent. for cash in ten days. To all trade other

than that above mentioned our plan is to ask for cash against documents at the border or for an arrangement under which cash is delivered to the manager of our Mexico City office as soon as invoices are delivered to our Mexican office.

Shirt Manufacturers. We still continue selling in Mexico on a cash basis, either requesting cash with the order or drawing on the customer through a bank on the border line with instructions to deliver shipping papers against payment.

Manufacturers of Locks. We have been selling in Mexico for the last few years strictly on a cash basis with very rare exceptions, or we have been selling with bill of lading attached through a bank in the United States on the border, or on a confirmed bank credit.

Mexican Bank Finances Shipments

I discussed this matter of commercial credits with the head of a banking firm in Mexico City—a man who has had twenty years continuous experience in the country and is intimately acquainted with the conditions. I asked him to outline for the benefit of American exporters his

method of dealing with the problem. His statement follows:

"As regards terms of payment to be offered the Mexican merchant, it is my opinion that to request him to pay cash with his order is practically the same as inviting him to purchase elsewhere, and when it is realized how difficult it would be to establish a domestic business under such conditions, it is apparent why trade with Latin America cannot be built up in that manner. Goods can be shipped with sight draft attached to shipping documents, collection to be effected through a bank, but even under these terms it is very difficult for the merchant here to do business, besides, there always exists the danger to the seller, that the buyer if unscrupulous, and when giving his order makes no deposit to bind the deal, may refuse to take up the draft when presented to him and the seller finds himself with the merchandise on his hands and in a foreign country.

"For an American firm to extend direct credit to a merchant in Mexico at present, where because of years of internal strife business cannot yet be considered normalized, is in my opinion something that should be undertaken only by firms who are thoroughly familiar with the

situation, in a position to judge credit risks, and preferably on the ground in order to protect their interests. As few American firms are in this position, it is our desire to assist them by eliminating the element of risk in giving credit, our plan being to finance shipments to merchants here by means of commercial credits.

"We are in a position to have confirmed bankers' credits opened by our New York and San Antonio correspondents, for account of firms in Mexico wishing to purchase goods in the United States. These credits, of course, are only opened to merchants who are deserving of them and who make the necessary arrangements with us. The operation is as follows:

"A merchant in Mexico desires to buy a bill of goods for \$5,000 from Brown, a merchant in New York City who is not disposed to sell excepting against payment in the United States. On the other hand, the merchant in Mexico wants ninety days from the date on which the shipment is made in New York in which to pay for the goods. If the merchant here makes the necessary arrangements with us, we will open a confirmed banker's credit for this purpose, we requesting our New York correspondent to accept Brown's draft drawn on them at ninety days' sight, with documents attached, covering

shipment from New York to Vera Cruz, for account of the Mexican buyer. When our New York correspondent receives the authorization from us to open this credit, they will advise Brown to that effect; that is, that they will accept Brown's ninety-day draft up to \$5,000 if presented with corresponding documents attached. The buyer will place a time limit within which Brown can present his draft to our New York correspondent, this limit being advised when the credit is opened.

"While it is true that Brown does not receive cash for this shipment, he receives a document that is very easily negotiated, the accepting bank discounting it for him if he so desires. As Brown must wait the sixty or ninety days until maturity of the draft before receiving his money, he can reimburse himself the loss of interest by adding the amount to his invoice or, and preferably, simply quote prices that will cover this extra expense.

"It is a general custom that the merchant at whose request a credit is opened pay the bank who authorizes it the corresponding commission, and in the past this has been our practice here, but we find that the Mexican merchant objects to this procedure as he considers that the firm selling goods should extend him direct

credit. We believe that this stand is taken more out of a question of principle than anything else, as it is obvious that regardless of what arrangements are made for paying for this service, the buyer of the goods must ultimately pay for it. Nevertheless, we find in practice that it is preferable that the seller of the goods take into consideration this point and quote the Mexican buyer net prices, simply adding to the price of his merchandise what it will cost him to discount the bank acceptance and our commission, which we believe in the majority of cases is more than covered by the usual cash discount.

"Under this arrangement, the foreign merchant can quote prices allowing sixty or ninety days, the only condition being that we pass on the credit, and instead of receiving a note or an acceptance from the buyer, he receives a New York bank's acceptance. We here receive the merchant's note as our security.

"The American firm before soliciting an order to be handled under this arrangement would, of course, have to consult us in order to ascertain if we can issue the credit. This can be done by mail or cable, or if the order is solicited by a salesman in this country, he would first call on us to find out which firms we can extend

credit to, after which he approaches the buyers, with the knowledge that he can offer sixty or ninety days from date of shipment in which to pay for their purchases, the only condition being that the buyer's note be made out in our favour.

"Another and simpler form of extending credit to merchants here, under our guarantee, is that of drawing thirty to ninety days draft in our favour but direct on the buyer. The merchandise is consigned to us and turned over to the Mexican firm against the acceptance of the seller's draft. Under this arrangement, we would simply guarantee to the American firm the payment of their draft at maturity, once accepted.

"A merchant buying goods under this arrangement would consider that he is being extended direct credit by the seller, as we do not appear in the transaction, our commission being paid by the drawer of the draft, who would of course consider this expense when quoting prices for his merchandise. However, in this case it is also necessary that the American merchant first consult us for each and every operation to ascertain whether we can give the necessary guarantee."

Proposed New Banking Law

In view of the interest which is being shown in the new law for the regulation of banks and institutions of credit in Mexico, submitted to Congress by President Carranza through the Department of Finance, it will be of interest to recall for purposes of comparison some of the provisions of the banking law of March 19, 1897, and at the same time to note the rapid growth and development of the Mexican banking system which followed the enactment of that law.

The American commercial attaché in Mexico, Edward F. Feely, in a comprehensive study of the Mexican banking situation, points out that by the provisions of the law of 1897, banks and institutions of credits were divided into three principal classes, based on the particular functions they would be called on to perform: (1) Banks of emission, which issued bank notes of given denominations, payable at par, on demand, and to bearer; (2) mortgage banks, which made loans secured by urban or rural estates, and issued bonds secured by the same guaranty, bearing interest and redeemable under stated circumstances and at given times; (3) banks of promotion, which were specially designed to

encourage mining, agricultural and industrial enterprises, with the faculty of making preferred loans, unsecured by mortgage, and issuing short-time bonds or certificates running for a certain term and payable on a certain date.

The enactment of this law was followed by a period of economic and commercial development, which continued throughout the presidency of Gen. Porfirio Diaz, and in which the banking system of the country played a leading part.

*Rapid Development of Banking From
1897 to 1913*

Before the end of 1897 there had been established in Mexico nine banks of emission, with total assets of \$68,565,519, the most important of which were the Banco Nacional de Mexico and the Banco de Londres y Mexico, both in Mexico City, and with branches in the important cities and towns of the interior. Under the liberal provisions of the law there were established between the years 1897 and 1913 a total of thirty-two banks of emission throughout the Republic, and according to statistics published by the Department of Finance in 1913 there were in existence in Mexico at that time

twenty such banks, with total assets amounting to about \$425,500,000.

Beginning with a single institution in 1897, with assets of \$4,857,000, the importance of mortgage banks increased rapidly, until in 1913 four such banks had been established, with assets totaling about \$43,762,000.

The banks of promotion found a wide field for the development of their business in the way of financing mining and agricultural enterprises, and at the end of the fiscal year 1913, the last year for which such statistics are available, the total assets of such banks amounted to over \$83,000,000, divided among six institutions.

In addition to the banks enumerated above there were in active operation at the same time two general banks of deposit, one loan bank for the promotion of agricultural and irrigation enterprises, besides six branches of foreign banks, a number of private banking institutions, and the Monte de Piedad or National Pawnshop under federal control. The latter institution is classed as a bank, inasmuch as it formerly had the faculty of issuing notes and accepting deposits. It is the oldest banking institution in Mexico today.

During the turbulent period which followed

the fall of President Diaz, and the consequent struggle between revolutionary parties to secure control of the government, this great system of banks, with total assets amounting to about \$600,000,000, built up and firmly established by a prosperous existence of seventeen years, was forced out of existence, its assets wiped out, its reserves taken over, and the banks themselves finally declared insolvent. Since 1914, therefore, Mexico has been without banks of any sort within the meaning of the law of 1897.

Plans for a Single Bank of Issue

In a message to Congress in September, 1918, the Executive attributed his failure to use the authority previously given him by that body to promulgate a law for the establishment of a sole bank of emission to the uncertain state of the money market resulting from the European war and the difficulty of obtaining a loan for that purpose at a fair rate of interest. But the idea prevails among business men and bankers that efforts will be made by the government to finance the new bank of emission without looking abroad for the necessary capital.

Policy of Nationalization

This nationalization of banks and credit institutions would be in accordance with the policy which the present government has manifested in its efforts to secure control of the key industries of the country; but, on the other hand, the sources from which the capital needed for the establishment of the new banks under the proposed law are to be drawn are not apparent. In this connection it should be noted that according to the provisions of the new law governing banks in general, no bank may invest in the stock of any similar institution, but only in that of the sole bank of emission.

It is also significant as defining the attitude of the government toward the general policy of nationalization, that in submitting the new law to Congress, the Executive explained that while its provisions are in general accord with those of the banking law of 1897, nevertheless the amendments and additions which now appear have been inspired by the precepts of the Federal Constitution and also by the new orientation which the present government has decided to give to the development of the country financially.

Of equal interest in connection with the new

law are the reasons given by the Executive in his letter of submittal for the modifications and amendments in respect of the new classification of banks, of their various functions, and especially of the provisions that are to govern branches of foreign banks which may be established in the Republic.

Under the proposed law the following classification of banks and institutions of credit is made :

Sole bank of emission, to be established later in conformity with the provisions of the Federal Constitution.

Mortgage banks, defined as those which shall make loans secured by urban or rural real estate, with the faculty of issuing bonds secured by the same guarantee, bearing interest and redeemable under stated circumstances and at given times.

Banks of promotion, created especially to facilitate or encourage mining, industrial, and commercial operations, by means of priority loans; granting their guarantee for certain operations and issuing short-term cash or treasury bonds, bearing interest and payable on a fixed day.

Agricultural banks, which shall make loans and advances for the purchase of equipment or expense of operation, to be secured by the products and crops of the farm, and with the priority of rights conceded by law.

Petroleum banks, which shall make all kinds of loans and advances for equipment and operation to petroleum exploitation enterprises—such loans to be secured by the actual products of such exploitation, and with the prior rights conceded by this law.

Banks of deposit, including those banks which shall have the faculty of carrying on any kind of banking transaction under the conditions determined by this law, with the exception of the issuance of notes, treasury bonds, or mortgage bonds.

The purpose of this classification is to promote by the specialization of functions a more facile and efficient response to the needs of the different lines of production, and so guarantee ready capital for the promotion of industry, commerce, and agriculture. Hence none of the different kinds of banks is to possess the faculty of carrying on the particular transactions of any of the others.

An important modification of the banking law of March 19, 1897, is that under the new law the capital stock of the agricultural banks, the banks of deposit, and of the banks of promotion shall be at least 500,000 pesos (\$250,000), and that of the mortgage and petroleum banks at least 1,000,000 pesos (\$500,000), these minima having been prescribed after a consideration of the comparative importance of the operations

to be carried on by each kind of bank, and in order to facilitate the creation of the greatest possible number of agricultural banks, each with a relatively small capital, so as to supply the needs of the agricultural and stock-raising industries in all sections of the country.

In view of the present economic condition of the nation, the exhaustion of resources and the decrease in reserve capital, it is not to be expected that financial interests will readily seek investment, nor that bank deposits will increase with rapidity. In order, therefore, that the new banks may begin operations with perfect security it has been judged necessary that their entire capital stock be contributed at once, instead of the mere 10 per cent. generally prescribed by the commercial code for the establishment of corporations.

In order to avoid confusion, and so that the interests of the public may be fully guaranteed, the use of the word "bank" or any equivalent term, for the designation of firms or establishments which are not duly authorized credit institutions within the terms of this law, is prohibited. A period of six months is given to those firms or establishments, both national and foreign, which have been employing the word "bank," to discontinue its use unless they shall

submit within that time to the provisions of the new law. The laws now in force prohibiting the issuance of bills, promissory notes, or any other document payable at sight and to bearer by individuals or corporations not duly authorized so to do are, by the terms of this law, amplified and extended.

Among the provisions of the new law which merits special attention is that which prohibits all banks from charging penal interest, whether expressly as such, as commission, or in any other form whatsoever. The special procedure provided by the former law for the collection by banks of their outstanding obligations has been suppressed because, in the opinion of the Executive, it involved the granting of a privilege contrary to the spirit of the Constitution.

To secure a more effective guarantee of deposits received by the mortgage banks, the new law provides that that portion of such deposits which is secured by discountable documents shall not exceed 25 per cent. of the total deposits of the bank, and that such documents shall be payable within a period not to exceed three instead of six months, as fixed by the former law.

Banks of Promotion

In determining the particular kind of operations which shall be carried on by banks of promotion, it was thought advisable to limit such banks to the emission of treasury bonds or certificates, and to loans in cash, secured by real estate or by furniture, fixtures and equipment, at terms not to exceed one year, to commercial, mining, and industrial establishments for their promotion and encouragement.

The new law, therefore, eliminates the granting of promotion loans to agricultural enterprises by banks of promotion, such assistance to be furnished in future by the agricultural banks. The former field of action of banks of promotion is, however, extended to include financial assistance to commercial enterprises. In this way it is hoped that all industries will be assured a source of supply of capital for promotion purposes by applying to the particular kind of bank designated by law for that object.

An important modification is embodied in the provision that promotion loans shall not exceed three-fourths of the total amount represented by the sum of the capital stock of the bank plus the value of the treasury bonds or certificates

in circulation, instead of two-thirds of such total amount, as provided by the former law.

Banks of promotion will also be obliged to carry on hand in cash at least 50 per cent. of the amount of their deposits, an additional 25 per cent. to be secured by documents bearing at least three first-class signatures and payable at periods not to exceed ninety days, and the balance, 25 per cent., by similar documents payable at periods not to exceed six months, or by obligations received as security for promotion loans.

Under the proposed law the agricultural banks shall have as their field of operations the granting of loans in cash, secured by real estate or chattels, at terms not to exceed five years, to large agricultural and stock-raising enterprises for their encouragement and development. They may also make advances in cash at terms not to exceed one year for the equipment and operation of smaller enterprises, such loans to be secured by the crops and products of the farm. Facilities are thus offered to the small farmer to enable him to carry on cultivation of his property for a year, repaying the amount of the loan out of the proceeds of the harvest. Agricultural banks will also be permitted to

accept deposits under the same terms as the banks of promotion.

A novelty in the new law is the provision providing for the establishment of the petroleum banks and granting to such institutions facilities for the promotion and encouragement of the petroleum industry. These are made necessary, it is explained, by the rapid increase in importance of this industry in Mexico, and its peculiar requirements as distinguished from those of agriculture and commerce.

Banks of Deposit

The so-called banks of deposit are not characterized by any particular kind of operations. They may carry on any sort of banking business with the exception of the issuance of notes, mortgage bonds, or treasury bonds, or certificates, but the law provides that the loans for promotion and operation purposes which they may make shall not enjoy the prior rights and protection conceded by law to agricultural banks and banks of promotion. Deposits received by banks of deposit must be secured to the extent of 50 per cent. by gold reserves on hand; 25 per cent. by documents bearing at least three first-class independent signatures, payable at terms

not to exceed ninety days; and the balance by their capital stock.

In stating the reasons which underlie the embodiment in the new law of special provisions to govern the establishment and regulation of foreign banks in Mexico, the principle is laid down that the banking system of the country is of public interest, and that foreign banks and institutions of credit must therefore submit to the national laws. In accordance with this principle it is provided that foreign banks or other foreign institutions of credit which may wish to establish branches in the Republic, besides complying with the requisites of inscription and registry prescribed by Article 24 of the Commercial Code, must also obtain from the Department of Finance the particular concession required by law, according to the kind of banking transactions they intend to carry on; with the understanding that no such branch of a foreign bank may operate except under a single one of the different classifications enumerated above, even though by virtue of its concession or of foreign laws it might have the right to make transactions which would correspond to those of other kinds of banks specified under this law.

It is further provided that the capital of such

branches of foreign banks shall be the same as that prescribed for national banks according to the classification under which they may fall, and that this capital may not be withdrawn from the Republic while the branch exists. In addition, such institutions shall be considered Mexican for all purposes, and neither they nor their employés may invoke rights of alienage.

It is explained that these dispositions are justified by the consideration that foreign institutions of credit, in so far as their local branches are concerned, ought not to occupy a better position nor enjoy greater privileges than the national banks; but that, at the same time, the unity of the banking system demands that they be placed on an equal footing with the latter in respect of requirements, advantages, and measures of security.

It is therefore proposed that foreign banks, their local branches, and any other credit institutions at present existent in the Republic, must submit to the terms of the law within a period of six months, or cease to operate within the Republic, even as private banks. It is therefore apparent that if the new banking law of Mexico should be adopted in its present form it would inevitably close the doors of every foreign bank in the Republic. Therefore, in

view of the pressing need of Mexico for financial support from other countries it is probable that important alterations will be made.

*Stockholding Restrictions—Federal Inspection
—Bank of Emission*

Of the enactments affecting all banks under the law now in force, there have been incorporated in the proposed law those which seemed to be in accord with the fundamental ideas of the new project, and some additions have been made as well.

All banks are expressly prohibited from acquiring stock in other credit institutions in the Republic, except the stock of the sole bank of emission. It is further provided that if stock should be received as collateral or for any other purpose, such stock may not be represented by the bank holding it in general meetings of stockholders, the idea being to avoid monopolies and to prevent one bank from exercising pressure on another. This danger, it is said, does not exist in the case of the sole bank of emission, since the government will always possess the majority of the shares and exercise control of it according to the provisions of the Federal Constitution.

As hitherto, the Department of Finance will have charge of the fiscalization of all banks and institutions of credit, with unlimited power to inspect all books, papers, and transactions of the banks, as well as to ask whatever information may be necessary to a full knowledge of the state of their affairs. This work will usually be done by inspectors or auditors, acting without fixed assignment in order thus to avoid all probability of connivance. The function of these auditors will be merely to investigate the affairs of the bank, and they will have no authority to intervene therein, nor to make any decision on their own initiative, but will simply report the result of their investigations to the Department of Finance so that the necessary corrective measures may be taken.

If a bank should fail to comply with any of the requirements or conditions prescribed in this law for the protection or benefit of the public, and if such failure is not of a nature to warrant the cancellation of the concession, the Department of Finance, after hearing the interested bank, may order it to suspend any or all of its operations until such time as it may have complied with the requirements or conditions of the law.

The power of issuing notes of a fixed value,

payable at sight to the bearer, shall belong to a single bank under Federal control, as provided by Article 28 of the Constitution of February 5, 1917. The operation of this bank shall be governed exclusively by a special law to be promulgated for that purpose.

Other Provisions

Among the other important provisions of the new law that will be of interest to foreign banks which may be considering the establishment of branches in Mexico, as well as to those institutions at present engaged in the banking business there, are the following:

Art. 10. The establishment of two distinct institutions of credit under the same concession shall not be authorized, nor shall authority be given to a bank for the omission of various kinds of securities which by their nature and within the meaning of this law may correspond to institutions of different classifications.

Art. 11. Under no circumstances shall concessions for the establishment of credit institutions be granted until the applicants therefor have deposited in the National Treasury or in the sole bank of issue stock or bonds of the proposed bank, or bonds of public debt, whose nominal value shall be at least 20 per cent.

of the sum which the new bank is required to have on hand for its establishment. (See Art. 14, Sec. "d.") This deposit shall be returned as soon as the bank may have begun operations.

Art. 14. Sec. "b." The capital stock of corporations organized in the Republic for the exploitation of credit institutions shall never be less than 500,000 pesos (\$250,000 United States currency) for agricultural banks, banks of deposit, and banks of promotion; and never less than 1,000,000 pesos (\$500,000 United States currency) for mortgage banks, and petroleum banks.

Sec. "d." No such corporation shall be established without having its capital stock entirely subscribed and available in cash.

Sec. "f." The reserve fund so-called shall be made up of the accumulation of 10 per cent. of the annual net profits until such time as it equals one-third or more of the amount of capital invested.

Sec. "g." In general assemblies of stockholders, the minority shall have the right to name a representative with the same powers as those prescribed for similar officers by the commercial code, and such representative shall have in addition the power to call a general meeting and to inform the Department of Finance of any irregularities or infractions of the law governing credit institutions, or of the criminal code.

Art. 16. Institutions established in foreign countries which issue securities payable to bearer shall not maintain in the Republic agencies or branches for the

issuance or redemption of such securities, nor agencies for the reception of deposits.

Art. 23. No individual or company not duly authorized so to do by the terms of this law shall have the power to issue bills, notes, or any other document bearing the promise to pay in cash to bearer at sight.

Constructive Help Needed by New Exporters

In the way of constructive assistance at home it is interesting to know that British banking interests are organizing a bank of discount for foreign trade which will also undertake to guarantee or insure foreign credits, keeping closely in touch with conditions in foreign markets through resident representatives. It would seem that the establishment of such an institution in the United States would not only be a profitable investment, but would also be of the greatest assistance to our exporters; especially to those who are not experienced in foreign trade, and who hesitate to enter the field directly for lack of acquaintance with banking methods and credit conditions abroad. Its services could be made especially valuable in respect to Mexico, owing to the anomalous situation which prevails there.

CHAPTER X

NATIONAL DEBT

Paper money. Items in national debt. Unpaid interest. Railway debt. International Bankers Committee.

IT is an indisputable fact that from the founding of the Mexican Republic to the present administration there has never been any tendency on the part of the government to repudiate any of its financial obligations. The late T. W. Osterheld, who was an authority on Mexican finances, points to the history of the first two loans of the Republic as proof of its integrity. The Mexican Government, in assuming the responsibility of the Spanish debt, received \$11,000,000 for a \$30,000,000 loan, paid \$29,500,000 for the service of the loan and finally in 1890 extinguished this debt by the payment of over \$62,000,000. A more recent example, taken from the present administration, may be seen in the conversion of the paper money issued by the Provisional Government during the first few months of its existence at Mexico City, and later at Vera Cruz, in order to maintain the Army

while the new government was in formation. This issue amounted to, in all, about 670,000,000 pesos, the larger part of which was redeemed as taxes, railroad fares, etc., and the balance amounting to about 50,000,000 pesos being converted into gold certificates, payable in five years, on the basis of five cents gold for each peso of Constitutional paper, which was greatly in excess of its value at that time.

From 1912 to 1916 Mexico had one revolution after another; commencing with the overthrow of Diaz by Madero and the final success of General Carranza. "On only two occasions during this period did Mexico appeal for foreign capital," writes Osterheld. "Once in 1912, when the government under President Madero floated a \$10,000,000 4½ per cent. gold loan, through Messrs. Speyer & Co., in New York, and Speyer Brothers in London. In 1913, during the administration of Huerta, there was authorized an issue of ten-year 6 per cent. gold bonds in an amount of £16,000,000, which could be increased with the approval of the bankers to £20,000,000. This loan was to be secured by 38 per cent. of the import and export duties of Mexico, and in the agreement with the bankers it was stipulated that no further external loan should be made for a period of two years."

The loan had for its object the repayment of the Madero loan made by Speyer & Co., and Speyer Brothers (about 41,000,000 pesos), to guarantee the certificates issued by the National Railways of Mexico for interest not paid on its bonds, to cover certain guarantees to the banks of issue, for the guaranteeing of railroad subventions, and for providing equipment for the army, purchase of the Mexican National Packing House, and the deficit existing in the budget. Under contract with the bankers in Paris, £6,000,000 of these were placed under the date of June 8, 1913, and further amounts were offered for subscription in Mexico City by the secretary of the treasury by decree and authorization granted by the Mexican Congress, under the stipulated conditions as agreed with the bankers in Paris. The legality of £700,000 of this issue brought out in London by Reuter & Co. has been questioned."

In 1914 the loss of income caused by the revolution resulted in the non-payment of interest on all bonds with the exception of a few local railway bonds, such as those of the United Railways of Yucatan. The military campaigns of General Carranza were financed entirely with paper money. The first issue of this, ordered by decree dated April 26, 1913, was for 5,000,-

000 pesos, known as the Monclova issue. In December, 1913, this was increased by 20,000,000 pesos, and in February, 1914, it was raised again by 30,000,000 pesos. The amounts issued against this last authorization totaled 25,000,000 pesos.

When the Constitutional Army arrived in Mexico City in August, 1914, it was found expedient to convert the previous issues of paper money, and at the same time make a larger issue to meet the increased expenses necessitated by the occupation of the southern part of the country. Therefore, on November 19, 1914, an issue of 130,000,000 pesos was sanctioned, in order to convert the Monclova and Constitutional issues, and at the same time provide money for the campaign against Villa. About 43,000,000 pesos were printed in Mexico City and were known under the name of the "Provisional Government of Mexico Issue." The printing continued in Vera Cruz, the issue being increased to 200,000,000 pesos and later to 250,000,000. It is estimated that the total amount of paper money issued during the first and second periods of the revolution was 671,954,221 pesos.

During this period there were several issues of paper money made by such generals as Francisco Villa, Alvaro Obregon and Pablo Gon-

zalez, while the revolution was still in its early stages, and under authorization granted by General Carranza. Villa and at least one other general printed paper money greatly in excess of that authorized. As already pointed out, redemption of the Vera Cruz issue was made in the form of railway fares, taxes, etc., and the balance, amounting to 50,000,000 pesos, was converted into gold certificates, payable in five years, on the basis of five cents gold for each peso of Constitutional paper. All other authorized issues were duly withdrawn and exchanged in part, leaving at present only about 2,000,000 pesos outstanding, which are under care of the Monetary Commission pending conversion.

The final issue of paper money, that which is now outstanding, was the paper known as Infalsificables (non-counterfeitable) or Carranza bills. These were printed in New York by the American Bank Note Company in the denominations of five, ten, twenty, fifty and hundred pesos bills, in an amount of 450,000,000 pesos. It was found necessary, however, to print in Mexico City, small bills of two and one peso notes, as well as five, ten and twenty centavo denominations, which increased the total issue to nearly 540,000,000 pesos. Of this amount, only 400,000,000 were placed in the hands of the

public, half of which were redeemed the first year through the medium of railroad fares, freight fares, and import and export duties.

In 1916 Mexico was placed on a gold and silver basis. Since then, redemption has continued steadily through the medium of import and export duties, which also include all oil shipped from Mexico, so that today it has been conservatively estimated that not more than 80,000,000 pesos are outstanding. Redemption is taking place at the rate of approximately 100,000 pesos daily, which are burned in the Public Square in Mexico City. It is expected that the balance outstanding will be entirely redeemed during 1919-20. Should this be found impracticable before the entire amount is redeemed, it is expected that some such system as was adopted in the case of the Vera Cruz paper will be used. The present market value of infalsificables is three cents per peso (United States currency) but in view of the previous acts of the Mexican Government it is assumed that the final redemption of the small amount of bills which will be outstanding will be at ten cents United States gold, their issuing rate. At that rate the amount now involved does not exceed \$8,000,000 United States currency.

During the revolution, the government found

occasion to borrow money from the Banks of Issue, the total of which is stated to be about \$20,000,000. At the same time, it must be borne in mind that there is a large amount due to the government employés for back salaries, and that a certain amount will have to be paid for property destroyed during the revolution, including the damage done to the various railway lines.

The subjoined table shows in detail the constitution of the national debt; with interest approximated to 1919:

CONSOLIDATED 3 PER CENT. INTERIOR DEBT, 1885	
Bonds in circulation	\$ 21,215,462.00
Interest due	3,182,319.00
REDEEMABLE 5 PER CENT. INTERIOR DEBT, 1894 (First and Second Series)	
Bonds in circulation	45,395,550.00
Interest due	11,348,887.00
CITY OF MEXICO 5 PER CENT. FOREIGN LOAN, 1889	
Bonds in circulation	6,762,907.00
Interest due	1,690,726.50
FOREIGN 5 PER CENT. LOAN, (1899)	
Bonds in circulation	48,603,414.00
Interest due	12,150,853.50
FOREIGN 4 PER CENT. LOAN, (1904)	
Bonds in circulation	37,037,500.00
Interest due	7,407,500.00
FOREIGN 4 PER CENT. LOAN, (1901)	
Bonds in circulation	51,065,246.00
Interest due	10,213,049.00
FOREIGN 6 PER CENT. TREASURY BONDS, 1913 (Series "A" only)	
Bonds in circulation	30,000,000.00

Interest due	\$ 9,000,000.00
Due on "Religious Fund of California" five years unpaid	107,627.47
Madero loan	50,000,000.00
Interest due (about)	5,000,000.00
<i>Other Bonds Guaranteed by Mexican Government:</i>	
Caja de Prestamos 35 year 4½ per cent. Sinking Fund	25,719,790.00
Interest due	5,786,952.75
Mexican National Packing Co. 6 per cent. 1st and 2nd mortgage Gold Bonds	4,500,000.00
Interest due	1,350,000.00
State of Vera Cruz, 5 per cent., 1901	588,000.00
Interest due	147,000.00
State of Vera Cruz, 5 per cent., 1906	332,000.00
Interest due	83,000.00
State of Tamaulipas, 5 per cent., 1902	449,750.00
Interest due	112,437.50
State of Tamaulipas, 5 per cent., 1906	399,800.00
Interest due	99,950.00
State of Sinaloa, 5 per cent., 1906	233,350.00
Interest due	58,337.50

Total \$350,181,047.47

In addition to the above items, the total funded debt of the National Railways of Mexico and subsidiary lines on June 30, 1918, amounted to \$238,740,393, on which there is accumulated interest up to January 1, 1919, of \$51,824,139 (dollars).

International Bankers Committee

Leading American, French and British bankers have united, with the knowledge of their re-

spective governments, to inform themselves "as fully as possible as to existing conditions in Mexico with a view to such positive action as may be taken whenever circumstances permit." Through the International Bankers Committee on Mexico, the formation of which was announced Feb. 24, 1919, they will act jointly for the protection of the interests of holders of Mexican Government, railway and industrial securities. J. P. Morgan is chairman of the committee.

It is known that the committee was launched after an extensive series of conferences both here and abroad, to some of which representatives of the three governments are believed to have been invited. The bankers represented on the committee recognize that they virtually control the financial markets which any Mexican Government in quest of funds would have to visit.

Thomas Cochran, of J. P. Morgan & Co., acting for Mr. Morgan, issued a statement regarding the International Bankers Committee, as follows:

"The following international committee has been constituted for the purpose of protecting the holders of securities of the Mexican Republic and of the various railway systems of Mex-

ico. The committee will be prepared to take such further steps as may seem wise in order to afford counsel and aid to investors who hold interests in Mexico:

J. P. Morgan, chairman, of J. P. Morgan & Co.

John J. Mitchell, president Illinois Trust & Saving Bank, Chicago.

Walter T. Rosen, of Ladenburg, Thalmann & Co.

Chas. H. Sabin, president Guaranty Trust Company, New York.

Mortimer L. Schiff, of Kuhn, Loeb Co.

James A. Stillman, chairman of the board, National City Bank, New York.

James N. Wallace, president Central Union Trust Co., New York.

Albert H. Wiggin, chairman of the board, Chase National Bank, New York.

Robert Winsor, of Kidder, Peabody & Co., Boston.

Laurence Currie, of Glyn Mills, Currie & Co., London.

Sir Clarendon Hyde, of S. Pearson & Son, Limited, London.

E. R. Peacock, chairman of the bondholders' committee of the Mexican Tramways and the

Mexican Light and Power group of companies,
London.

Vivian H. Smith, of Morgan, Grenfell & Co.,
London.

Vincent W. Yorke, chairman of the Mexican
Railway Co., Ltd., London.

William d'Eichthal, of Mirabaud & Co., Paris.

Georges Heine, director of the Banque de
l'Union Parisienne.

Andre Honnorat, member of the Commission
for the Protection of French Holders of Mexican
Securities.

Jacques Kulp, auditor of the Banque de Paris
et des Pays-Bas, Paris.

Joseph Simon, Inspector of Finance, general
delegate of the Commission for the Protection
of French Holders of Mexican Securities.

"This committee is not yet prepared to an-
nounce a definite program of procedure, but in
general its functions will be to inform itself
as fully as possible as to existing conditions in
Mexico with a view to such positive action as
may be taken whenever circumstances permit.
Especial care has been taken as to the composi-
tion of the committee upon a broad international
basis, so as thereby to insure so far as may be
joint and united action by security holders in

all three countries concerned; namely, the United States, Great Britain and France.

"The United States State Department at Washington and the foreign offices respectively of the British and French governments have been advised of the formation of this committee.

"Each American member has named an alternate to serve in case of need, and the following have been appointed to serve as such alternates:

John H. Fulton for James A. Stillman.

Benjamin S. Guinness for Walter T. Rosen.

Jerome J. Hanauer for Mortimer L. Schiff.

E. D. Hulbert for John J. Mitchell.

Thomas W. Lamont for J. P. Morgan.

Frank W. Remick for Robert Winsor.

Francis H. Sisson for Chas. H. Sabin.

Edward R. Tinker for Albert H. Wiggin.

J. Y. G. Walker for James N. Wallace.

Mr. Lamont is also a member of the National Association for the Protection of American Rights in Mexico, and will probably serve as a link between the two committees. Although they will remain independent of each other, it is understood that they will co-operate. The National Association is composed chiefly of industrial men and comprises only Americans. The bankers' committee will gather authorita-

tive statistics about foreign investments in Mexico, which are now loosely estimated at between \$1,000,000,000 and \$2,000,000,000.

Step Toward Rehabilitation

Rafael Nieto, then acting Minister of Finance of Mexico, visited New York in February and March, 1919, on a mission of "inquiry" to learn the terms on which the present government of Mexico can get banking assistance in the United States for the rehabilitation of the national and railway debt. Mr. Nieto estimated the national debt outstanding at \$250,000,000, and added that the railway debt guaranteed by the government would bring the total up to \$370,000,000.

All estimates of the bonded indebtedness of Mexico disagree and absolutely accurate figures are unavailable. Statements issued by the Carranza administration, for instance, always ignore the debts incurred by Huerta.

CHAPTER XI

MEXICAN CONSTITUTION OF 1917

Effect upon foreign investments. Taxes. Decree of February 19, 1918. American Government protests. President Wilson's address to Mexican editors. Protests from British and French Governments and replies of Mexican Government.

In 1917 a constitutional assembly in Mexico adopted a constitution altering Article 27 of the Constitution of 1857 to read as follows:

Art. 27. The ownership of lands and waters within the limits of the national territory is vested originally in the nation, which has had and has the right to transmit title thereof to private persons, thereby constituting private property.

Private property shall not be expropriated except for cause of public utility and by means of indemnification.

Legal capacity to acquire ownership of lands and waters of the nation shall be governed by the following provisions:

1. Only Mexicans by birth or naturalization and Mexican companies have the right to acquire ownership in lands, waters, and their appurtenances, or to obtain concessions to develop mines, waters or min-

eral fuels in the Republic of Mexico. The nation may grant the same right to foreigners, provided they agree before the Department of Foreign Affairs to be considered Mexicans in respect to such property, and accordingly not to invoke the protection of their governments in respect to the same, under penalty, in case of breach, of forfeiture to the nation of property so acquired. Within a zone of 100 kilometres from the frontiers, and of fifty kilometres from the sea-coast, no foreigner shall under any conditions acquire direct ownership of lands and waters.

Legislation from 1884 to 1917,—whose authenticity and binding force have never been questioned,—has consistently upheld the principle that the owner of the surface is likewise the owner of all mineral fuels in the subsoil.

Article 10 of the Mexican Mining Law of November 22, 1884, states that “the following substances are the exclusive property of the owner of the land, who may, therefore, develop and enjoy them, without the formality of claim (denuncio) or special adjudication . . . petroleum and gaseous springs, etc.”

The mining law of June 4, 1892, states that “the owner of land may freely work, without a special franchise in any case whatsoever, the following substances: mineral fuels; oils and mineral water; etc.”

The mining law of November 25, 1909, effective January 1, 1910, states, in Article 2, that "the following are the property of the owner of the soil: I. Ore bodies or deposits of mineral fuels, of whatever form or variety, etc."

In reliance upon these laws, American companies have purchased and leased petroleum tracts in Mexico, and by expenditure of over \$300,000,000 in lands, leases, camps, pipe lines, pumping stations, wharves, tank steamers, etc., have created, from the bare exude indications which led to their investment, an industry of great proportions, and of enormous significance to the United States.

The provision, therefore, in Article 27 of the 1917 constitution vesting the "legal ownership" of petroleum in the nation, "seems to indicate," in the language of the protest addressed by the United States to Mexico under date of April 2, 1918, "an intention to separate the ownership of the surface from that of the mineral deposits of the subsurface." Were this attempt to be carried into effect, there would necessarily result the confiscation of legitimately acquired rights in oil fields and mines.

The constitution of 1917, however, if properly interpreted, offers a safeguard against such action. Article 14 thereof provides:

Art. 14. No law shall be given retroactive effect to the prejudice of any person whatsoever.

Prior to the presentation of his credentials as ambassador to the de facto Mexican Government on February 20, 1917, the Hon. Henry P. Fletcher was assured by the Mexican Minister for Foreign Affairs that Article 14 guaranteed Americans against confiscation of their properties. However, on February 19, 1918, under a general authorization by Congress to legislate on matters of finance, the following executive decree was issued:

Art. 1. There is hereby established a tax on oil-bearing lands and on oil contracts executed prior to May 1, 1917, covering leases of lands for the development of hydrocarbons or permits to undertake such development whenever a consideration has passed.

Art. 2. Annual rentals stipulated in the contracts to which reference is made in Article 1 hereof are taxed as follows:

A. Rentals of five pesos per annum per hectare, or less, 10 per cent. of their amount.

B. Rentals of more than five pesos and of less than ten pesos per annum per hectare, 10 per cent. on the first five pesos, and 20 per cent. on the balance.

C. Rentals of over ten pesos per annum per hectare, 10 per cent. on the first five pesos, 20 per cent.

on the next five pesos, and 50 per cent. on any remainder above 10 pesos.

Art. 3. All royalties stipulated in oil contracts are taxed 50 per cent. of their amount, in cash or in kind, according to the decision of the Department of Finance.

Art. 4. Claims (fundos) operated by the owners of the surface are assessed an annual rental of five pesos per annum per hectare, and a royalty of 5 per cent. of the output, in cash or in kind, according to the decision of the department in each case.

Art. 5. The Department of Finance shall notify taxpayers during the last two weeks of each two-monthly period whether they are to pay the royalty incurred for the period of two months ending with the said two weeks in cash or in kind.

Art. 6. Taxes assessed under Article 2 shall be paid in the local Stamp Tax Bureau having jurisdiction over the lands in question; and in case the said lands appertain to several jurisdictions, payment shall be made in the bureau designated by the Department of Finance, after consulting the taxpayer. Such payment shall be made in advance during the first two weeks of each period of two months.

Art. 7. Royalties assessed in cash shall be paid in the bureaus fixed by the above article on the dates therein prescribed, covering two-monthly periods in advance.

Art. 8. Payment of the amounts mentioned in Articles 2, 3 and 4 hereof shall be made by means of

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special stamps bearing the legend: "Rentas Petroleras."

Art. 9. Persons liable to the taxes established by this law shall file during the first two weeks of each two-monthly period a statement (manifestacion) on the forms to be issued by the General Stamp Tax Bureau (Direccion General del Timbre) setting forth the rentals, output, and other data necessary for the assessment of the taxes. These statements shall be delivered at the stamp tax bureaus mentioned in Article 6 hereof.

Art. 10. Transfers of contracts taxed under this law shall be communicated to the bureaus mentioned in Article 6 hereof, within thirty days following their execution. Apart from this obligation on the part of the contracting parties to give notice, the notaries public before whom such operations are executed shall give immediate notice thereof to the General Stamp Tax Bureau.

Art. 11. Royalties, or portions thereof, when payable in kind, shall be delivered in any of the storage stations belonging to the operating company or individual, at the choice of the Department of Finance, which shall designate the place of delivery at the same time as it indicates the form of payment.

Art. 12. Whenever royalties, or portions thereof are payable in cash, their amount shall be determined by taking the fiscal value of the products at the port of shipment as fixed by the two-monthly schedules of the Department of Finance, after deducting the cost

of transportation by pipe-line, according to the distance, from the point of production to the port of shipment and the average schedule for the public authorized by the Department of Industry, Commerce and Labour for the pipe-lines of that region. The Tax Bureau of the Department of Finance shall be required to inform opportunely the local Stamp Tax Bureaus of the valuations above mentioned, so that these bureaus may check the statements.

Art. 13. Oil-bearing land paying no rental at present shall be assessed five pesos per annum per hectare, and lands paying no royalties shall be assessed 5 per cent. of the output. The payments mentioned in this article shall comply with the same conditions as are established by this law for other taxpayers.

Art. 14. Owners of lands desiring to develop petroleum in the subsoil on their own account and who have made no oil contract, and the last assignees of the right of development under contracts mentioned in Article 1 of this law, shall file a statement within three months following the promulgation of this decree, enclosing certified copies of their contracts of purchase, lease or otherwise, with the Department of Industry, Commerce and Labour, which department shall revise the statements, rejecting those containing data not duly certified. On the expiration of this time, all petroleum lands not registered in the form prescribed in this article shall be deemed open to entry (vacante); and claims thereon and the development thereof shall be governed by regulations

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to be issued on the subject, which regulations shall determine what persons are liable to the taxes assessed hereunder.

Art. 15. Contracts mentioned in this law should be executed by public deed, and contracts under private deed shall be valid only when the formality of a public deed is not made necessary by the size of the operation, and when by other unquestionable methods of proof it is shown that they have been executed in the form of a private deed, on the dates and under the terms indicated.

Art. 16. The royalties established by this law, the portions of royalty fixed by Article 3 hereof, the tax on rentals fixed in Article 2 and the other rentals established hereunder shall be delivered in local Stamp Tax Bureaus by the operators or the last assignees of the right of development, who, on making their payments to intermediate assignees, or to the owners, shall deduct the proportional part of the taxes to be borne by either of these, so that the federal rentals and royalties shall be distributed in the same proportion as the rentals and royalties at present established on oil-bearing lands in the several oil contracts now in force.

Art. 17. Taxes not paid within the period fixed by the law shall pay a surcharge of 10 per cent. for each month of deferred payment.

Art. 18. The revenue derived from the taxes levied hereunder shall be distributed as follows:

Sixty per cent. to the Federal Government.

Twenty per cent. to the State Government within whose jurisdiction is located the land in question.

Twenty per cent. to the Municipality within whose jurisdiction is located the land in question.

When the lands are situated in two or more municipalities, or in two or more States, the Department of Finance shall distribute the tax, taking into consideration the amount of land comprised within each jurisdiction, the situation of the wells, their output and other pertinent facts.

Art. 19. Infractions of the provisions of this law shall be punished by fines varying from fifty to 1,000 pesos, according to the gravity of the offence. This shall not bar the institution of judicial proceedings if a criminal offence shall have been committed.

This law shall take effect from the date of its promulgation.

(Signed) V. CARRANZA.

February 19, 1918.

Against this decree, the United States, Great Britain, Holland and France made protest. The American Government's protest was published in the Official Bulletin of June 29, 1918, as follows:

*Text of Fletcher Note of Protest Against Tax
on Oil Lands in Mexico Owned by United
States Citizens*

The State Department's attention has been called to press comment published in Mexico to the effect that Ambassador Fletcher's note of April 2, 1918, respecting the Mexican decree of February 19, 1918, establishing a tax on oil lands, is inconsistent with the President's address to the Mexican editors now visiting this country. The United States Government would have appreciated being asked for its consent to the publication of this note inasmuch as this procedure is usually followed in diplomatic dealings between friendly nations. Such consent would of course have been readily given if the Mexican Government had intimated that it believed the note should be published.

An examination of the note proves that all that the United States asks for its citizens who have made investments in Mexico relying on the good faith and justice of the Mexican Government and Mexican laws is justice and fair dealing. There is no disposition on the part of the United States Government to interfere in the internal affairs of Mexico. However, the seizure of property at the will of the sovereign

without due legal process equitably administered and without provision for just compensation has always been regarded as a denial of justice and a cause for diplomatic representation.

President Wilson's Address

The President in his speech referring to Mexico's future said:

"It must depend upon every nation that has any relations with her, and the citizens of any nation that has relations with her, keeping within the bounds of honour and fair dealing and justice, because so soon as you can admit your own capital and the capital of the world to the free use of the resources of Mexico it will be one of the most wonderfully rich and prosperous countries in the world."

The President further pointed out that the basis for the future relations of nations was trust, and said:

"As long as there is suspicion there is going to be misunderstanding, and as long as there is misunderstanding there is going to be trouble. If you can once get a situation of trust then you have got a situation of permanent peace."

Note of April 2

The United States always desires to accord to the Mexican Government and people justice and fair dealing, and it is confident that it will be accorded the same justice and the same fair dealing in return.

The note of April 2 is as follows:

MEXICO, April 2, 1918.

Excellency:

The decree of the 19th of February, 1918, which was published in the *Diario Oficial* on the 27th of February last, establishing a tax on oil lands and on oil contracts executed prior to the 1st of May, 1917, etc., has been brought to the attention of my government, and I am under instruction to state to Your Excellency that my government has given most careful consideration to the effect which this decree, if carried into operation, will have upon American interests and property rights in Mexico.

Provisions of the Decree

The said decree provides for the imposition of certain taxes on the surface of oil lands, as well as on the rents, royalties, and production derived from the exploitation thereof. It is noted also that among the provisions for the collection of such taxes is one re-

quiring that payment in kind shall be delivered to the Mexican Government at the storage stations of the operators. Articles IV, XIII, and XIV of the said decree seem to indicate an intention to separate the ownership of the surface from that of the mineral deposits of the subsurface, and to allow the owners of the surface a mere preference in so far as concerns the right to work the subsoil deposits upon compliance with certain conditions which are specified. While the United States Government is not disposed to request for its citizens exemption from the payment of their ordinary and just share of the burdens of taxation so long as the tax is uniform and not discriminatory in its operation, and can fairly be considered a tax and not a confiscation or unfair imposition, and while the United States Government is not inclined to interpose in behalf of its citizens in case of expropriation of private property for sound reasons of public welfare, and upon just compensation and by legal proceedings before tribunals, allowing fair and equal opportunity to be heard and giving due consideration to American rights, nevertheless the United States cannot acquiesce in any procedure ostensibly or nominally in the form of taxation or the exercise of eminent domain, but really resulting in the confiscation of private property and arbitrary deprivation of vested rights.

Not a New Principle

Your Excellency will understand that this is not an assertion of any new principle of international law, but merely a reiteration of those recognized principles which my government is convinced form the basis of international respect and good neighbourhood. The seizure or spoliation of property at the mere will of the sovereign and without due legal process fairly and equitably administered, has always been regarded as a denial of justice and as according internationally a basis of interposition.

My government is not in a position to state definitely that the operation of the aforementioned decree will, in effect, amount to confiscation of American interests. Nevertheless, it is deemed important that the Government of the United States should state at this time the real apprehension which it entertains as to the possible effect of this decree upon the vested rights of American citizens in oil properties in Mexico. The amount of taxes to be levied by this decree are in themselves a very great burden on the oil industry, and if they are not confiscatory in effect—and as to this my government reserves opinion—they at least indicate a trend in that direction. It is represented to the State Department that the taxation borne by the oil fields of Mexico very greatly exceeds that imposed on the industry anywhere else in the world. Moreover, it would be possible under the terms of the decree, in view of the fact that the Mexican Govern-

ment has not storage facilities for the taxes or royalties required to be paid in kind, by storing the same in the tanks of the operators, to monopolize such storage facilities to the point of practical confiscation thereof until emptied by order of the Mexican Government or by the forced sale of the stored petroleum to the operators at extravagant rates.

Surface and Subsurface Rights

It is, however, to the principle involved in the apparent attempt at separation of surface and subsurface rights under this decree that my government desires to direct special attention. It would appear that the decree in question is an effort to put into effect as to petroleum lands Paragraph 4 of Article 27 of the Constitution of May 1, 1917, by severing at one stroke the ownership of the petroleum deposits from the ownership of the surface, notwithstanding that the Constitution provides that "private property shall not be expropriated except by reason of public utility and by means of indemnification." So far as my government is aware no provision has been made by Your Excellency's Government for just compensation for such arbitrary divestment of rights nor for the establishment of any tribunal invested with the functions of determining justly and fairly what indemnification is due to American interests. Moreover, there appears not the slightest indication that the separation of mineral rights from surface rights is a

matter of public utility upon which the right of expropriation depends, according to the terms of the Constitution itself. In the absence of the establishment of any procedure looking to the prevention of spoliation of American citizens and in the absence of any assurance were such procedure established, that it would not uphold in defiance of international law and justice the arbitrary confiscations of Mexican authorities, it becomes the function of the Government of the United States most earnestly and respectfully to call the attention of the Mexican Government to the necessity which may arise to impel it to protect the property of its citizens in Mexico divested or injuriously affected by the decree above cited.

The investments of American citizens in the oil properties in Mexico have been made in reliance upon the good faith and justice of the Mexican Government and Mexican laws, and my government cannot believe that the enlightened government of a neighbouring Republic at peace and at a stage in its progress when the development of its resources so greatly depends on its maintaining good faith with investors and operators, whom it has virtually invited to spend their wealth and energy within its borders, will disregard its clear and just obligations toward them.

Acting under instructions, I have the honour to request Your Excellency to be good enough to lay before His Excellency, the President of Mexico, this formal and solemn protest of the Government of the United States against the violation or infringement

of legitimately acquired American private property rights involved in the enforcement of the said decree.

Accept, Excellency, the renewed assurance of my highest consideration.

HENRY P. FLETCHER.

The American Government's note was delivered on April 4. On May 18, 1918, the Carranza Government issued a decree extending to July 31, 1918, the term set in the law on oil-bearing lands and oil contracts for the filing of statements. On July 8, 1918, a decree regulating Article 14 of the decree of February 19, 1918, was issued, further amendments being made on August 8, 1918. On July 31, 1918, the decree of February 19 was re-issued with slight alterations.

On August 12, 1918, a new decree was issued by President Carranza under extraordinary powers in the Department of Finance conferred upon him by Congress, containing the following provisions:

Art. 1. Petroleum claims which have been surveyed and in which capital has been invested for oil exploration or development, and statements regarding which have not been filed up to August 15, 1918, as prescribed in the decree of July 31, 1918, shall not be open to entry.

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Art. 2. The right to the petroleum development of these properties shall be acquired by means of special contracts to be executed with the Department of Industry, Commerce and Labour, in conformity with regulations to be issued on the subject, until such time as the organic law contemplated in Article 27 of the constitution shall determine the method of granting of franchises (concesiones) on this subject.

Art. 3. The present holders or operators of such properties who shall not have filed the statements required in the decree mentioned above shall continue to hold and operate the said properties on payment into the Federal Treasury of an annual rental of five pesos per hectare and of a royalty of 5 per cent. of the output, until such time as the basic terms are published for the execution of the respective contracts. But if the interested parties shall prove that they are in possession of the said properties under contracts executed prior to May 1, 1917, they shall continue to hold and operate such properties subject to the obligation to pay the tax imposed on petroleum contracts by the Decree of July 31, 1918.

Art. 4. The present operators of such properties may continue to develop work already begun and authorized, after compliance with the requirements laid down in the foregoing article; but they shall not be permitted to undertake new work until after the execution of contracts granting the right to develop such claims.

Art. 5. All persons liable to the taxes established

under Article 2 hereof shall make their payments in accordance with Articles 6, 7, 8, 9, 10 and 11 of the decree aforementioned (July 31).

Art. 6. Payment of taxes levied hereunder shall give the payers thereof the preferential right to the execution of the contracts to which Article 2 hereof refers.

Art. 7. Failure to make payment of the taxes levied under Article 3 hereof shall result in the forfeiture of the preferential right acquired through such payment, and shall cause the claim in question to be declared open to entry or the preference to be granted to another.

Art. 8. The executive may make use of the right of coercion in securing observance of the fiscal obligations imposed hereunder.

(This law shall become effective from August 16, 1918.) (Signed) V. CARRANZA.

The British Government on April 30, 1918, directed to the Mexican Government the following note:

(Note and reply translated from *El Universal*, Mexico City, August 13, 1918.)

BRITISH LEGATION, MEXICO, April 30, 1918, No. 34.
Mr. Minister:

In accordance with instructions I have received from the Prime Minister for Foreign Affairs of His Majesty, I have the honour to inform Your Excellency that the provisions of the Petroleum Decree of the 19th of last

February, imposing new charges on petroleum-bearing lands and on contracts covering petroleum, have been examined with due care by the government of His Majesty.

His Majesty's Government considers that this decree, especially in reference to the measures mentioned in Articles 3, 4, 11, 12, 13, 14 and 16, is of an arbitrary and confiscatory character, which imposes an appalling charge on the petroleum industry, the result of which will be that an exaction of tribute on the petroleum industry will exist, higher than that in any other country in the world.

The provisions of the decree are in the opinion of the government of His Majesty in open conflict with laws and contracts in force, according to which considerable investments of British capital have been made in petroleum-bearing lands, and in the petroleum industry in Mexico.

His Majesty's Government observes that the payment of taxes in kind, mentioned in the decree, might produce a monopoly of facilities at present existing for storage of petroleum, and that it would be contrary to the principles of the Mexican Constitution and those of justice to separate surface rights from subsoil rights which now belong to those land owners who have invested capital in the petroleum-producing zone.

For the above reasons His Majesty's Government formally and energetically protests against the putting into effect of the provisions of the decree in question

so far as concerns British subjects and British capital, and holds the Mexican Government responsible for all loss and damage which might result to English subjects and capital as a consequence of the decree.

I avail myself of this opportunity to renew to Your Excellency the assurance of my high esteem.

(Signed) H. A. CUMMINGS.

To His Excellency General Candido Aguilar,
Minister of Foreign Relations,
Mexico.

The reply of the Mexican Government to the foregoing note follows:

MEXICO CITY, Aug. 12, 1918.

. . . Without judging the exactness or inexactness of the qualifications of established taxes, the Mexican Government can only express the surprise caused by the note and the protest of his Britannic Majesty, for, in the capacity of an independent nation in the legitimate exercise of her sovereignty, Mexico issued a decree against which the only recourse that Mexican laws concede is when they judge onerous and confiscatory taxes decreed by public power.

The surprise of the Mexican Government is legitimate, as would be that of any other government of a free country, including that of his Britannic Majesty, if it found that acts of interior legislation such as the right of imposing contributions were called into question by the diplomatic protests of the countries of subjects affected by the imposition. The Mexican Gov-

ernment is sure that the Government of His Majesty would not permit diplomatic protests against the high contributions that the war has caused him to decree in all his dominions, and which would weigh equally, not only upon British subjects and subjects of conquered nations, or those subjected in any form to his dominion, but upon foreigners alike.

In virtue of its freedom of fiscal legislation, it is opportune to declare that the Mexican Government does not recognize the right of any foreign country to protest against acts of this nature coming from the right to exercise interior sovereignty, and, in consequence, cannot accept the responsibility which it is pretended will be charged to her account as supposed damages as a consequence of this legislation.

Such a decision is founded upon the equality which the Mexican Government desires should exist between Mexicans and foreigners regarding contributions decreed in its territory, because it is deemed that, conceding the preferences to which all diplomatic intervention tends, such a decision is fair to Mexico in its strictest terms.

The course to be taken by foreigners and nationals alike to free themselves from impositions which are deemed confiscatory consists in submitting the case before tribunals, which are always found ready to administer justice, applying the law, which justly guarantees individuals against confiscation of property. Furthermore, it is generally admitted that diplomatic representation should be the last recourse taken and only when the last resources have been exhausted.

If the provisions of the decree are openly against the laws and in violation of contracts previously made, according to the concept of his Britannic Majesty, such could not rationally constitute an obstacle to the free development of Mexican property, and this development can demand, as has happened, certain changes of legislation beneficial to the country. This is evident when it is considered that the modern concept of property is that it is a social function bound closely to the prosperity of the State.

The Mexican Government has a firm purpose in respect to foreign interests. It gives them guarantees facilitating their development and believes that its program can only be realized through the laws and institutions of the republic by applying disposition equally.

Esteeming that it is the best guarantee it can impart, the Mexican Government cannot see a way to accept the diplomatic protests from his Britannic Majesty, which would have the effect of giving English citizens unequal preference over Mexican nationals.

CANDIDO AGUILAR.

The protest of the French Government follows:

FRENCH LEGATION,
MEXICO CITY, May 13, 1918.

Excellency:

The Decree of February 19 last levying new taxes on oil-bearing lands and contracts relating to the sale

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of petroleum has aroused considerable concern among the numerous stockholders of foreign or Mexican oil companies established in Mexico.

They complain particularly that the provisions of Articles 3, 4, 11, 12, 13 and 14 of the new decree impose upon the industry fiscal charges so burdensome as not to be comparable with those levied by other countries. They claim that these regulations, strict compliance with which might entail confiscation, rest on principles of law wholly different from those on which was based the legislation in force when their investments in petroleum in Mexico were made. At that time no attempt was made to establish differences between surface rights and those flowing from sub-surface ownership; it is due to this distinction that it has been possible to assess the new taxes which deprive companies of almost all the profits they had hoped to enjoy from the capital invested, thereby gravely jeopardizing the existence of some of these concerns.

Acting under instructions from my government, I beg to call to the attention of Your Excellency the serious situation that may be faced by the oil companies as the result of this new measure, and to say that I am constrained to make all reservations as to the consequences that may befall the French shareholders of such companies.

Accordingly, I appeal to Your Excellency to bring your influence to bear on behalf of the interests with whose defence I am charged.

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Accept, Mr. Secretary, the assurances of my very high consideration.

(Signed) F. DEJEAN.

The reply of the Mexican Government to the French note of protest follows:

DEPARTMENT OF FOREIGN AFFAIRS.

No. 2770

MEXICO, Aug. 15, 1918.

Mr. Chargé d'Affaires:

I have the honour, under instructions from the President of the Republic, to make reply to your note of May 13 last, which Your Excellency addressed to this Government with regard to the Decree of February 19 fixing a tax on oil-bearing lands and oil contracts. On the assumption that this decree is a new regulation in oil legislation which might bring about a serious situation for companies in which French stockholders are interested, Y. E., under orders from your Government, is pleased to call the attention of this department to such disadvantages, and to add that you are constrained to make all reservations as to the consequences that might be caused to such stockholders. At the same time, Y. E. is pleased to appeal to this department to bring its influence to bear on behalf of the interests with whose defence you are charged.

The President has instructed me to give to Y. E. all assurances as to the fate of the interests you so worthily represent, since the French shareholders may, under the protection of the laws and institutions of the Republic, appeal to the Mexican courts in the

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event of their considering the tax which gave rise to the note of Your Excellency either burdensome or prejudicial to their interests, with the certainty that justice will be done them. Further, I am authorized to state to Your Excellency that the Mexican Government in its desire to facilitate the development of the natural resources of the country, will be quick to modify the legislation on the subject if their application shows that they fail in their purposes and if the damages which foreign and national interests believe they suffer as the result of their enforcement are adequately proved before the courts of the nation.

The Mexican Government is keenly interested in the development and security of foreign investment in Mexico; it is confident it will achieve this purpose by its legislation and through its authorities, and the one no less than the other, Your Excellency may be quite sure, will justly consider all steps taken by French stockholders in defence of their interests.

Permit me to express the hope that the French Government will be duly apprised by Your Excellency as to the true character of the measures of the Mexican Government on this subject, and to renew to Y. E. the assurances of my kind consideration.

(Signed) C. AGUILAR.

In December, 1918, President Carranza presented to the Mexican Congress a bill embodying a Petroleum Code, containing 125 articles. Articles 1 to 16 will give a clear indication of

the proposed legislation, which failed to pass the last session of the Mexican Congress, but which will be considered in all probability in an amended form at the regular session in November, 1919. An extract from this bill is given below:

Whereas the increasing importance of the oil industry requires that preference be given to a settlement of all the problems having a relation to the said industry, so that its development may be intensified by the investment of new capital; and

Whereas such a result can only be attained by the institution of a legal system which shall consolidate past investments,

Now, therefore, the Executive by virtue of the power conferred on him by Sec. I, Art. 71, of the Federal Constitution, hereby submits to the consideration of the Congress the following

PROPOSED ORGANIC LAW OF ARTICLE 27 OF THE CONSTITUTION IN THE MATTER OF PETROLEUM.

Art. 1. The Nation enjoys the legal ownership of the following substances which are subject to the provision of this law:

I.—Ore bodies, measures and natural deposits of petroleum;

II.—Gaseous hydrocarbons to be found in the subsoil or those seeping through the ground to the surface;

III.—Natural deposits of ozokerite and asphalt; and

IV.—All mixtures of hydrocarbons of the several kinds having their origin in natural phenomena.

ART. 2. The *legal ownership* of the Nation in the substances enumerated in the foregoing article is *inalienable and imprescriptible*; consequently the rights granted under this law shall not constitute absolute and definite ownership.

Art. 3. The rights granted under this law may be hypothecated, alienated and transferred wherever the general law authorizes such transactions in the case of real property; notice shall be given to the Department of Industry, Commerce and Labour of all such transactions. Failure to comply with this provision will be punished by a fine of from 50 to 500 pesos; and no operation of any kind whatsoever relating to the petroleum industry shall be carried out on any petroleum claim, so long as the fine remains unpaid.

Art. 4. The petroleum industry is hereby declared to be of public character; accordingly, condemnation proceedings shall lie for such portion of the surface as may be necessary for the development of the claims, in pursuance of what the law may prescribe on the subject.

Art. 5. Each petroleum claim shall be the object of a single franchise (concession).

Art. 6. A "petroleum claim" shall be understood to be a solid of indefinite depth limited laterally by

the vertical planes passing through the boundaries of a continuous area devoted to petroleum development.

Art. 7. The term "petroleum development" shall be understood to mean the extraction, reducing to possession or enjoyment of the substances enumerated in Article 1.

Art. 8. The surface area of a claim shall not be less than four hectares, and its shape shall be such as to permit the sinking of a well and the erection of a standard tank as prescribed by the regulations in force on the date of the franchise.

Art. 9. Franchises granted under this law by the Federal Government to individuals or to civil or *commercial associations organized under the laws of Mexico* shall be limited in purpose to the development of the substances enumerated in Article 1.

Art. 10. The grantee of a petroleum claim may extract therefrom and enjoy all substances mentioned in Article 1, without any other limitation than that of not trespassing in his development work on adjoining properties and that of complying with the provisions of this law and of such regulations as may be enacted on petroleum development.

Art. 11. Operators of a petroleum claim may appropriate within the limits of their claim, subject to authorization of the Executive, the surface area necessary for the work of extraction and for the immediate storage of the products extracted, paying in such event due compensation to whomsoever may be hereto enti-

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tled; any judicial action taken hereunder shall not interfere with the prosecution of the work.

Art. 12. Operators of a petroleum claim shall acquire easements of way and of pipe-lines on obtaining proper authorization from the Executive to install such pipe-lines and pumping stations as the development of the property demands, on payment of due compensation to whomsoever may be thereto entitled; any judicial action instituted hereunder shall not interfere with the prosecution of the work.

Art. 13. Operators of a petroleum claim shall have the right to establish storage stations and refineries, subject to the approval of the project by the Executive and to the assent of the owners of the lands it is sought to occupy. In the event of failure to obtain such assent, the necessary area may be condemned pursuant to the condemnation laws then in force.

Art. 14. Operators of petroleum claims shall have the right to build wharves, loading stations and submarine pipe lines subject to the approval of the Executive in conformity with the provisions in force in this regard.

Art. 15. Only grantees shall have the right to build storage tanks or refineries on their respective petroleum claims.

Art. 16. The grantee of a petroleum claim may use the surface waters for the needs of his operations, in pursuance of the general law on the subject. He may likewise use the subsoil waters for the same pur-

pose, subject to the authorization of the Executive and on payment of the due compensation to whomsoever may be hereto entitled.

The following values were assigned by the Mexican authorities as a basis for the 10 per cent. export tax during July-August and September-October, 1918:

	Pesos
Fuel Oil, of density 0.91, per ton.....	13.00
Crude Oil, of density 0.91, per ton.....	15.50
Oil, of density greater than 0.97, per ton..	6.00
Gas Oil, per ton.....	13.00
Refined Gasoline, per liter.....	0.125
Crude Gasoline, per liter.....	0.1175
Kerosene, crude or refined, per liter.....	0.04

As before, twenty centavos are to be deducted from the price fixed for each one one-hundredth increase in density, and forty centavos to be added to the price for each one one-hundredth decrease in density. One peso is at present something more than fifty cents in United States currency. At this rate fuel oil of density 0.91 is valued in our currency at \$7.15 a ton.

The usual rates of conversion of tons into barrels are as follows: for Tuxpam "crude oil" (0.93 specific gravity), 6.7 barrels to the metric ton; for Tuxpam "fuel oil" (0.949 specific grav-

ity), 6.5 barrels to the ton; for Panuco "crude" (0.98 specific gravity), six barrels to the ton. The conversion rate for density 0.91 would thus be about seven barrels to the ton, making fuel oil of this grade come to \$1.15 (United States currency) per barrel, and the tax, ten cents per barrel. The density of ordinary Mexican fuel oil, however, is 0.95. Making all the proper deductions, fuel oil of this grade is valued by the Mexican authorities at \$6.71 per ton or \$1.03 (United States currency) per barrel, and the tax likewise ten cents per barrel. According to the figures ruling before the change of September 13, the tax on this grade of oil was about twelve cents. The actual selling price of ordinary fuel oil in Mexico (free on board ship at Tampico) appears to range from twenty-eight to seventy-eight cents per barrel, according to density and per cent. of gasoline content. The lower prices pertain to heavier oil with a small per cent. of gasoline. Heavy Panuco, for instance, of about 0.98 density (twelve degrees Baume), sold at twenty-five cents per barrel (f. o. b. Tampico) on July 1, 1918. Even Tuxpam crude of 0.93 density has been recently quoted as low as forty-three cents per barrel at Tampico, although the usual price is higher. The highest price recently obtained for Tuxpam

fuel oil of 0.95 density was seventy-eight and one-fourth cents, but this appears to have occurred in only one consignment.

On July 14, 1919, the Mexican ambassador to the United States, Ygnacio Bonillas, made the following statement regarding the oil situation:

"I know that drilling permits are granted to companies and to individuals *who comply with the requisites of law*, and that a great many permits are being asked by companies who have not the means to take out all the oil the wells are capable of producing. The companies have never exported from Mexico more than 10 or 12 per cent. of the capacity of the wells. The Mexican Government has always been perfectly willing that they should export all they could to the full capacity.

"There is absolutely no intention on the part of the Mexican Government to confiscate properties. All that Mexico desires is to derive a revenue from this great natural wealth, which, previous to the establishment of the government emanating from the revolution, flowed out of the country without any benefit other than giving work to some of the people in the oil region. The oil men object to the revolutionary decrees, and the matter of legislation on oil subjects is in the hands of our Congress at the present time. It is my firm belief that when the Mexican Congress gets through with that legislation it will be equitable and just legislation which ought to be satisfactory to all."

CHAPTER XII

GOVERNMENT DEPARTMENTS AND INSTITUTIONS

National Congress. Departments. Education. Museums. Telegraphs, Post Office and Harbours. Libraries. Religion.

THE National Congress is composed of a Senate and a Chamber of Deputies, the former consisting of fifty-six members, two for each State and the Federal District, elected indirectly for a term of four years. One-half of the Senate is renewed every two years. The members of the Chamber of Deputies are also elected indirectly, but for a term of two years, in the proportion of one Deputy for 40,000 inhabitants or fraction exceeding 20,000.

Suffrage is possessed by all male citizens who have reached the age of eighteen years if married, and of twenty-one years if not married. Congress meets twice a year. The first session is from September 16 to December 15, and may be extended for thirty legislative days. The second session is from April 1 to May 31, which may be extended for fifteen legislative days.

During recess, Congress is represented by a

Permanent Committee consisting of fourteen Senators and fifteen Deputies, which has the power to convene Congress, either upon its own initiative or at the suggestion of the President, in extraordinary session. The duties of the committee are to advise the President relative to matters affecting legislation; to give its consent to the use of the national guard by the President upon certain occasions provided for by the constitution; to prepare a report on all pending legislative matters in order to expedite action by the next Congress; to give or withhold its approval of presidential appointments in the diplomatic and consular services, and to administer the oath of office to the President of the Republic and to the justices of the supreme court in certain cases provided for by the constitution.

The President and Vice-President are chosen by electors for a term of six years; the President is assisted by a cabinet of eight secretaries. His salary is 50,000 pesos, equal to \$25,000.

The cabinet officials are appointed by the President and are directly responsible to him for the proper administration of the respective departments.

The Department of Foreign Relations (Secretaria de Relaciones Exteriores) is charged

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with the conduct of all diplomatic and consular matters at home and abroad, the negotiation of treaties and conventions, the settlement of boundary disputes, and such other international matters as may arise from time to time. The secretary of this department has custody of the grand seal of the nation and is keeper of the national archives.

The Department of the Interior (Secretaria de Gobernacion) has charge of the administration of the Federal District and the National Territories; the regulation of the federal rural police, elections, immigration, public charities, sanitation, the National Printing Office, and the Official Gazette (Diario Oficial).

The Department of Justice (Secretaria de Justicia) has jurisdiction of the national judiciary comprising a supreme court, three circuit courts, and thirty-two district courts, as well as the various courts of the States, Territories, and Federal District. The eleven supreme court justices and four supernumerary justices are elected by indirect vote of the people for a term of six years.

The Department of Public Instruction and Fine Arts (Secretaria de Instruccion Publica y Bellas Artes) has supervision over the educational institutions of the Federal District and

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the National Territories, and over the higher grades of instruction in the various States. Under its scope are such institutions as the Academy of Fine Arts, the Conservatory of Music and Declamation, the National Pathological Institute, and other scientific academies and societies. Public libraries, registration of copyrights, national museums, and archæological exhibits also fall within the jurisdiction of this division.

The Department of Promotion (Secretaria de Fomento, Colonizacion e Industria), which is divided into five sections, is devoted to the regulation, progress, and development of the natural resources of the Republic. The forests, mines, agricultural lands, and water powers are each assigned to one of these sections for due attention and exploitation. Under this department are established the Bureau of Weights and Measures, Bureau of Printing and Engraving, Patent Office and Commercial Trade-marks, Registry of Deeds, Bureau of Statistics and Archives, and Publications.

The Department of Communications and Public Works (Secretaria de Comunicaciones y Obras Publicas) is charged with the regulation of all railways, private as well as government owned, street railways, telegraph and telephone

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systems, cables, wireless service, and with the improvement and development of highways, bridges, harbours, ports, and other means of communication and transportation. It also has charge of the various public buildings, and is empowered to maintain these as well as to erect new edifices when necessary.

The Department of Finance (Secretaria de Hacienda, Credito Publico y Comercio) has the duty of collecting all federal taxes, the administration of the custom houses, mints, and assay offices, the disbursing of public funds, compilation of commercial statistics, and such other fiscal matters connected with the administration of the government.

The Department of War and Marine (Secretaria de Guerra y Marina) has charge of all matters pertaining to the national defence, as well as supervision and maintenance of various naval and military schools and colleges.

Mexico is divided politically into 27 States, 3 Territories, and 1 Federal District. Governors of the States are elected in the same manner as the President of the Republic, as are also the legislatures and the judiciary of each State.

The Territories are administered by governors appointed by the President, while the government of the Federal District, which includes

the capital, Mexico City, is in the hands of three officials, likewise appointed by the President. The States and Territories are subdivided into municipalities, which elect their own administrative councils and mayors.

Notable progress has been made in the extension of the post and telegraph service in the Republic. There are now about 3,000 post-offices of all classes, 500 telegraph stations, with 25 telephone and 6 wireless-telegraph stations. The length of wire totals about 75,000 kilometres (46,602 miles), while the cable system shows a total length of cable amounting to 775,000 metres (over 480 miles).

Education

Education in Mexico has been for many years the subject of serious consideration on the part of the government. As early as 1836 it had been decreed that the department boards in the States should establish public schools. In 1843 there were 1,310 primary official schools, but the organization was neither complete nor systematic.

In 1910 the number of primary schools alone was 12,000, and the attendance in them substantially 1,000,000.

Elementary tuition is under the care of municipalities, and they are obliged to establish at least one school for each 4,000 inhabitants. Municipal schools of the Federal District and of the Territories come under Federal jurisdiction. The superior board of primary education (Direccion Superior de Instruccion Primaria) has been created for the organization, superintendence and management of said institutions.

On the other hand, the individual States exercise considerable discretion as to the manner in which such instruction is carried out, and are practically independent in their development of the higher grades and courses, each State encouraging high schools and special schools according to the needs of its own population.

The most advanced branches, those that fit students for technical or professional careers, are again subject to direct Federal control.

The Mexican university was founded by royal decree of January 25, 1553, and was followed by another at Guadalajara and by one of less importance at Chiapas. It was closed and dissolved during the unquiet times of 1862. The faculties teaching law, medicine, engineering and artistic branches continued their work, however, although organic association between them was lost.

The university has five faculties: law, medicine, engineering, fine arts, and the college of special (non-professional) studies. The scholastic year runs from February 1 to the end of November. The administration lies in the council consisting of two professors and one student from each faculty, the rector being appointed by the President of the Republic. The faculty of engineering receives the largest financial support, while that of fine arts (architecture having full faculty rank) has the most students.

The general program for primary education embraces morals, civic instruction, the national language, history, geography, arithmetic, the principles of physical and national sciences, together with drawing, singing, and for girls, sewing, etc. For superior primary instruction there are added French, several sciences in their principles, and advanced studies in graded work.

Museums. There are throughout the Republic museums of art, science and archæology. As a rule, each State has, in the capital city, a Museo del Estado (State Museum), devoted to State products and antiquities. The largest and best museum of the country is in the City of Mexico. It is a part of the National Palace, and is called the National Museum (Museo Nacional de Mexico).

Libraries. The Biblioteca Nacional (National Library), in the City of Mexico, is by far the largest, having about 200,000 volumes.

Religion. The Constitution expressly provides for the independence of Church and State. As might be expected from its history, the prevailing religion in Mexico is the Roman Catholic, the foundation of which may be said to date from 1517. However, the Mexican Episcopal Church, in reality a part of the general Protestant Episcopal Church, the Presbyterian Church, the Methodist Episcopal Church, the Baptist Church, and several other denominational as well as unsectarian religious organizations, have been established in the Republic.

As part of the educational forces of the Republic emphasis must be given to the numerous charitable and correctional institutions, supported to a large extent by the government, both of the nation and of the individual States, and also by private gifts and foundations. The manifestation of this spirit was one of the early incidents of the Spanish conquest, and in every city of colonial times there was an endowed hospital, school, and an asylum. Not a few of these institutions have disappeared with changing conditions; but many have preserved their identity or have been taken over by the government.

To these should be added the hospitals and penitentiaries started within the past generation.

Telegraphs, Post Office and Harbours

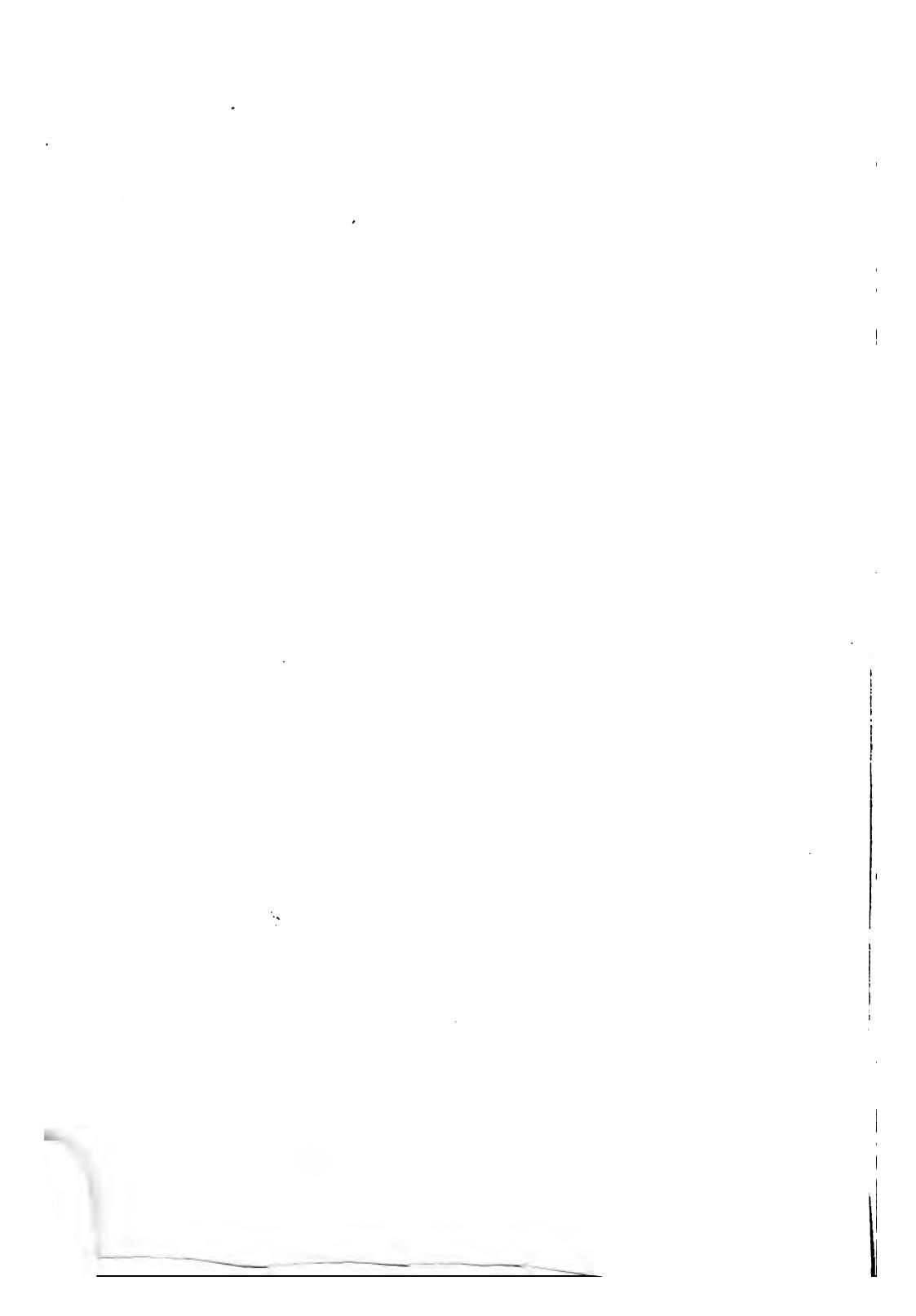
During the year 1918 a total of 291,902 parcel post packages passed through the Mexican post office, of which 277,357 were from the United States and 15,545 were from other foreign countries. As compared with the last previous year for which there are any official reports (1912-13), this shows a decrease in the number of packages from European countries of 91,253, while the number of packages from the United States increased 159,458.

Throughout practically the entire revolution the Carranza forces were kept busy restoring the telegraph and postal services as rapidly as new territory came under control. Repair gangs went with the armies into the field, and the telegraph lines, which had for the greater portion been destroyed by the enemy, not once but many times, were repaired, restored and put into operation with as little delay as possible. So closely was this work pushed that not infrequently civilians thus employed were killed or wounded by the enemy.

At the present time there is complete tele-



THE POST OFFICE IN MEXICO CITY—A BEAUTIFUL BUILDING EQUIPPED WITH EVERY
MODERN DEVICE FOR THE RAPID HANDLING OF MAIL.



graphic communication with all portions of the Republic, and this has been the case for many months. The last State to be thus provided was Morelos, where Zapata held sway so long, and which has now come under the control of the Federal Government. When the difficulties encountered are considered, the total destruction of equipment, the scarcity of suitable material for poles, and the remoteness from sources of supply, the promptness with which telegraphic communication has been restored and maintained is one of the most interesting achievements of the period.

One of the most important features of the work of reconstruction has been the establishment of a complete system of wireless telegraphy connecting all portions of Mexico, and acting as a safeguard against the cutting of the land wires by bands of marauders. The overwhelming importance of such a system was demonstrated during the revolution, and experts were accordingly dispatched to the United States for the purpose of securing the most modern appliances and inventions in wireless communication, and these have been utilized in the various centres of population. The stations at Saltillo, the capital of Coahuila, and at Chapultepec, in the suburbs of the capi-

tal, are the largest of the system, being of five kilowatt power. The other stations are all of two and one-half kilowatt power and are located at Vera Cruz, Torreon, Chihuahua, Campeche, Xcalak (in the territory of Quintana Roo), Mazatlan, San Jose del Cabo and Santa Rosalia in Lower California, and also at Guaymas, in Sonora, and under construction at Salina Cruz, Acapulco and Manzanillo. A wireless station has been established at Cananea, Sonora, by an American copper company.

The land service, which has always been the property of the Government and has afforded one of the cheapest methods of electric communication in any portion of the world, has been greatly extended since the Carranza government obtained control, and many places have been given telegraphic communication which were neglected before that time. The entire country is now covered and the service is in a practically normal condition.

The improvement of the harbours of Mexico is being undertaken gradually. One of the projects under way is the deepening of the channel of the Panuco River and the dredging of a deep sea channel across the bar at its mouth, affording easier access to the great oil exporting centre of Tampico. The jetties have also been re-

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paired. Similar work has been carried out at Tuxpam. At Vera Cruz the harbour has been dredged, new and substantial wharves erected, and the port put into shape to accommodate its rapidly growing traffic.

Arrangements are being made to improve the seaport of Progreso, Yucatan, which is at present merely an open roadstead, vessels lying several miles off shore. Harbour improvements are being carried out at Frontera, in the State of Tabasco, including the dredging of a channel through the bar, thus opening the Grijalva and Usumacinta rivers for navigation by ocean-going vessels into the interior and making of San Juan Bautista, the capital of the State, a port of entry. This improvement will afford shipping facilities for the export of vast quantities of fruit and other products, including the renowned bananas of that region, which are superior to the product elsewhere and command much higher prices.

At Coatzacoalcos wharves are being rebuilt and the channel dredged out. On the west coast work is being prosecuted at Guaymas and Mazatlan. At the latter place it is proposed to dredge a channel for deep water vessels into the estuary and establish there securely protected wharves for the accommodation of the

constantly increasing commerce of that port. A wharf is projected at Acapulco, where it is much needed, while the wharf at Manzanillo, which was destroyed during the revolution, is being rebuilt. At Salina Cruz also harbour improvements are being made.

The lighthouse service of Mexico has been overhauled. Much of the machinery and equipment of the lighthouses had either been destroyed or removed during the revolution and the buildings damaged. But this has all been remedied and mariners approaching the shore on either coast find the signals all in fairly good order.

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